Montana Trust Land

Grazing Lease Rate Valuation Analysis

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Report Prepared for: State of Montana Department of Natural Resources & Conservation: Trust Management Division

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EXECUTIVE SUMMARY

Setting and Objectives

Through the Enabling Act of February 22, 1889, the Congress of the United States gave to the State of Montana two sections of land from every township for common school support. The Enabling and other acts also granted acreage for other educational and state institutions. The original common school grant was for 5,188,000 acres. The additional acreage provided for other endowed institutions included 668,720 acres, for a total of 5,856,720 acres. The total acreage fluctuates through the years due to land sales and acquisitions.

This study focuses on those Montana trust lands that are currently leased to parties for grazing livestock. The MCA stipulates that in the leasing of these lands

> *"The tract must be leased to the highest bidder unless the board determines that the bid is not in the state's best interest for the reasons set forth in 77-6-205(2). The board may not accept a bid that is below full market value. (MCA 77-6-202)."*

The formula for setting the annual rental fee for grazing use of state trust lands is also outlined in Montana Statutes.

> ***77-6-507. Formula for fixing annual rental.*** *(1) In this section:*
> *(a) "animal unit" means one cow, one horse, five sheep, or five goats;*
> *(b) "animal-unit-month carrying capacity" means that amount of natural feed necessary for the complete subsistence of one animal unit for 1 month.*
> *(2) The board shall establish the per annum rental rate per section of all grazing lands that are the property of the state by multiplying a factor established by the board pursuant to 77-6-502 times the average price per pound of beef cattle on the farm in Montana for the previous year times the animal-unit-month carrying capacity of the land.*
> *(3) The carrying capacity of the land to be used in the above formula must be in accordance with the determinations of the department made under 77-6-201.*
> *(4) The average price per pound of beef cattle on the farm in Montana must be taken from statistics published by the United States department of agriculture current at the time of computation of the rental or from other reliable sources current at that time.*
> *(5) In establishing the rental rate described in subsection (2), the board shall consider applicable elements that include but are not limited to those set forth in 77-1-106.*

In 2011, the state of Montana included grazing use of trust lands within approximately 8,500 lease agreements. The 4.07 million acres of classified grazing lands and forest lands have an estimated carrying capacity of 975,766 animal-unit-months (AUMs). The minimum rental rate for 2011 of $6.23/AUM for grazing leases is set annually by a formula which includes the average weighted

price for beef cattle sold in Montana during the previous year. In FY 2010, grazing leases generated $6,483,884.

While grazing leases of state trust lands are let by competitive bid as mandated by statute, fully 95 percent of state grazing leases are renewed by application of the current leaseholder without competing bids. These renewed leases are thus leased at the minimum rate per AUM established annually by the state. One reason that there are not more competitively bid leases is that often state grazing leases are inholdings (due to the original designation of single sections within townships to support schools). Because of this, the number of livestock producers that can efficiently use the DNRC parcel may be limited by access or lack of fencing or other reasons (Duffield and Anderson 1993). Accordingly, it is appropriate to look to other methods to determine the fair market value of these leases. Given that such a large proportion of state grazing leases are not priced within a competitive market setting, the state of Montana has an interest in determining the appropriate full-market value for state trust land leases to help inform the setting of the annually determined base rental rate per AUM. While grazing is by far the largest single use of Montana school trust lands, earlier work (Duffield and Anderson 1993) estimated that, despite the legal mandate to obtain full market value for use of these lands, the average rate per AUM received is approximately 50% of the estimated full market value.

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> "Furnish DNRC with a report that estimates the statewide fair market rental rate for Montana state grazing leases given the terms and characteristics of those leases. The estimated fair market value rental rate must be made on a per animal unit month (AUM) basis.
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> The full market rate shall be identified through a review and reconciliation of existing data on grazing lease rental rates in Montana, including current private market rates and an earlier assessment by Bioeconomics, Inc. of the market rate for livestock grazing undertaken in 1992-1993. Current private market rates shall be obtained from the National Agricultural Statistics Service (NASS) which gathers information on and reports average private grazing rates per AUM on an annual basis.
>
> The hedonic price model of the Montana market for grazing leases, developed in 1992-1993, may be used in conjunction with current market price data to predict the full market price of grazing leases with the characteristics of state trust land grazing leases. The state trust land full market grazing lease rate per AUM for 2010 will be predicted as a ratio to the current private market average lease rate.
>
> The contractor shall also review the current economic literature to identify other recent studies that may relate to the issue."

Methods

This section briefly summarizes the methods used in this study to identify the full market value for Montana DNRC grazing leases. Results are summarized below. There are at least four general methods for identifying the full market value of Montana school trust land grazing leases. These methods are: 1) interpreting private market data: an hedonic model, 2) competitive bids for these lands, 3) grazing fees charged on other similar public lands, such as school trust lands in other states or for federal-administered leases, and 4) economic studies of this issue.

Hedonic model. One approach to identifying the full market lease rate for state trust land grazing leases is to identify how similar leases are valued in the private market. Like many commodities, such as automobiles, the value of grazing leases depends on the characteristics of the lease. In an hedonic model the price of a commodity is explained as a function of the commodity's characteristics; for example, car prices are a function of horsepower, size of the vehicle, and various amenities such as power steering and high quality interiors. This is a widely applied economic tool to explain price differences for market commodities. State leases are known to differ from the average private market lease in that they are longer term and no landowner services are provided such as fencing or water improvements. Duffield and Anderson (1993) developed a model to explain how private market lease rates (using data on actual Montana private leases) vary depending on the term and other factors such as landowner services. Based on this model, it was found that the full market value for state leases was 70% of the average private market lease rate.

Competitive bids for Montana DNRC grazing leases. Another approach is to look at the rate per AUM for the share of DNRC grazing leases that are competitively bid. There are around 40 to 50 such leases that are competitively bid each year, which provides direct evidence of the market for state school trust leases. These competitively bid leases for Montana DNRC lands average around 78% of the private market lease rate as detailed below.

Grazing fees on other public or trust lands. Another approach to potentially identifying market values for Montana DNRC leases is to examine lease rates used on other public or trust lands. The U.S. General Accounting Office (GAO) reviewed this data in 2005; in this study we update this data for several types of federal leases in Montana. We also review briefly lease rates on state lands in other, mostly western, states. In general there is a dichotomy in terms of public policy toward grazing lease rates. In many cases, such as leases administered by the USDA Forest Service and the Bureau of Land Management rates are far below the market rate and provide a considerable subsidy to the livestock industry. For other public leases (as described below, for example for Bureau of Indian Affairs and Department of Interior leases on federal National Wildlife Refuges in Montana) rates are actually the same as the private market.

Among states with regard to school trust land grazing leases, there is the same dichotomy with many states, like Montana, providing a considerable subsidy to ranchers. Table 1 shows the current grazing lease fees for 17 western states for state school trust lands. Several states were identified in Duffield

and Anderson (1993) where school advocates successfully challenged state grazing leases in court, specifically in Nebraska and Oklahoma. Based on GAO (2005) data for 2004, these are currently the only two states where full market values are being realized, with minimum bids at 70% and 87%, respectively, of the private market lease rates in Montana. These findings support the hedonic model estimates of Duffield and Anderson (1993) for Montana.

Economic literature. A final general approach to identifying the full market value for state trust land leases is to examine studies of this issue published in the economics literature. One such study, described more fully below, is Torell et al (1988) which is a study of lease rates in New Mexico. The findings from this study are similar to the Duffield and Anderson (1993) hedonic model for Montana, with the conclusion of a full market value at a lease rate of 74% of the private market rate.

Data Sources

The current analysis takes as its starting point the 1993 report for the Montana Department of State Lands on the fair market value for state land grazing leases (Duffield and Anderson 1993). This original report provided a discussion of relevant studies on grazing lease prices and valuation as well as extensive analysis based on original data collected on a broad spectrum of grazing leases in the State of Montana.

The results and conclusions from the 1993 DSL study have been augmented and updated in the current report using a number of sources of data, including:

1. U.S. Department of Agriculture, National Agricultural Statistics Service (NASS) data on statewide average private grazing fee rates (USDA National Agricultural Statistics Service 2011)
2. Montana DNRC lease rate data
3. Bureau of Indian Affairs (BIA) grazing lease rates data for Montana reservation lands
4. Federal National Wildlife Area (NWA) grazing lease rate data for the state of Montana.

TABLE 1. COMPARISON OF STATE TRUST LAND GRAZING FEES FOR 17 WESTERN STATES (SOURCE: KEVIN CHAPPELL MT DNRC).

STATE	GRAZING FEE	HOW FEE IS SET	ACRES UNDER LEASE	FY2010 GRAZING REVENUE
AZ	$2.28/AUM	Appraisal of value of forage	8,408,004	$2,403,080
CA	No set fee	Fair market rate appraisal	24,616	$7,759
CO	35% less than private	Through independent survey	2,651,950	$6,162,561
ID	$5.12/ AUM	By formula	1,415,667	$1,532,652
MN	$10-$40/acre--varies by county	Per acre basis or by AUM	1,767	$16,114
MT	Minimum of $6.12/AUM	7.54 X prior yr weighted beef price/lb	~4,070,000	$6,483,887
ND	Set by auction	Opening bid based on private markets. Auctioned every 5 years. Fee adjusted for fencing, soils, and weed control.	~ 687,000	$5,007,855
NE	$22.50-$38/AUM or $5.40-$41.85/acre	Based on private rates, economics of area, forage, soil types, and credits for lessee's fencing and wells.	1,011,771	$13,492,766
NM	$3.19/AUM	Fee formula based on NASS Economic Indices	8,821,745	$5,216,784
NV	Variable	Greater of average of last 3 yrs Beef Price Index divided by PPI or base value adjusted for inflation.	None	$0
OK	$8.34-$20.83/AUM	Market comparables set minimum at public auction	592,087	
OR	$5.30/AUM	By formula based on animal gain	~ 621,000	$356,911
SD	10.82/AUM	Set by statute	760,800	$4,360,000
TX	$65-$150/AUM	Market rate.	638,000	$500,000
UT	$3.92-$7/AUM	Fee formula with higher rent per AUM on larger blocks.	3,170,403	$790,761
WA	$8.78/AUM	Private rate less $2/AUM for services provided on private lands.	550,000	$677,405
WY	$4.64/AUM	By carrying capacity of land	3,494,197	$5,247,021

Summary Results and Conclusions

Sections 3 and 4 of this report discuss Montana grazing lease data that was previously compiled (Duffield and Anderson 1993), as well as current data on public and private land grazing fees for the state of Montana.

Table 2 summarizes this information and presents it from two comparative perspectives. First, the grazing fee data are presented as a comparison between the annual DNRC base grazing lease rate per AUM and the six alternative benchmark grazing rates examined. Additionally, a comparison is made between the DNRC base rate and alternative benchmark rates for 1992 and the most recent available years (2010-11). These comparisons are discussed in turn for each of the benchmark rates and for the DNRC base rate. Not all of the benchmark grazing rates shown in Table 2 are necessarily strictly comparable to the appropriate lease rates for state trust lands. Different leases are characterized by different levels of landowner services, different durations of the lease, and different land characteristics. The six benchmark estimates are presented to demonstrate the general range of Montana grazing lease rates.

DNRC Montana Base Trust land Grazing Rate

Consistent data series are available for both the private grazing fee rates published annually by NASS (APPENDIX D), and the base rental rate for Montana trust grazing land (APPENDIX A). Figure 1 shows a graph of those respective rates for the period 1979-2010.

A comparison of the two data series and their respective trendlines points out two clear and consistent differences between the rates over the time period. First, as noted in the 1993 report, the NASS private grazing fee rate is substantially higher than the DNCR base rate throughout the time period.[1] Additionally, the annual increase in the average private grazing fee is more than double that of the DNRC base rate.[2] The combination of these two trends results in a persistent gap between private and state grazing rates that increases over time. The implication is that state grazing fees on average are falling further and further behind benchmark fair market rates over time.

Row (A) of Table 2shows the DNRC base lease rate per AUM for 1992 and for 2010. Also shown for this rate (and for the following benchmark rates) are the percentage change in this rate from 1992 to 2010, what percentage of the NASS average Montana private lease rate this state rate was in 1992, and what percentage of the NASS private rate it is in the most recent year.
From 1992 to 2010 the DNRC base rate for grazing increases from $4.17 to $6.23 per AUM. This represents a 49% increase over the period. Between 1992 and 2010 the DNRC base rate decreased as a percent of the NASS-published average private grazing fee for Montana. In 1992 the DNRC base rate was 37% of the private rate, and in 2010 it was 34% of the private rate.

[1] Over the 1979-2010 period the private rate per AUM reported by NASS averages 281% of the DNRC base rate per AUM.
[2] The 1979-2010 private grazing fee per AUM for Montana increases by an average of 34.3 cents per year (95% C.I. 30.9 to 37.8 cents), while the DNRC base rate increase at an average 14.4 cents per AUM per year (95% C.I. 11.6 to 17.2 cents)

Appendix E details changes in DNRC and NASS grazing rates over time in inflation adjusted (2010) dollars. The trends over this period show that in real (constant dollar terms corrected for inflation) rates are flat to declining for both the DNRC base and the NASS private lease rates. For the period 2001 to 2010 private grazing rates corrected for inflation have been very stable at around $18.40 per AUM (see Appendix E).

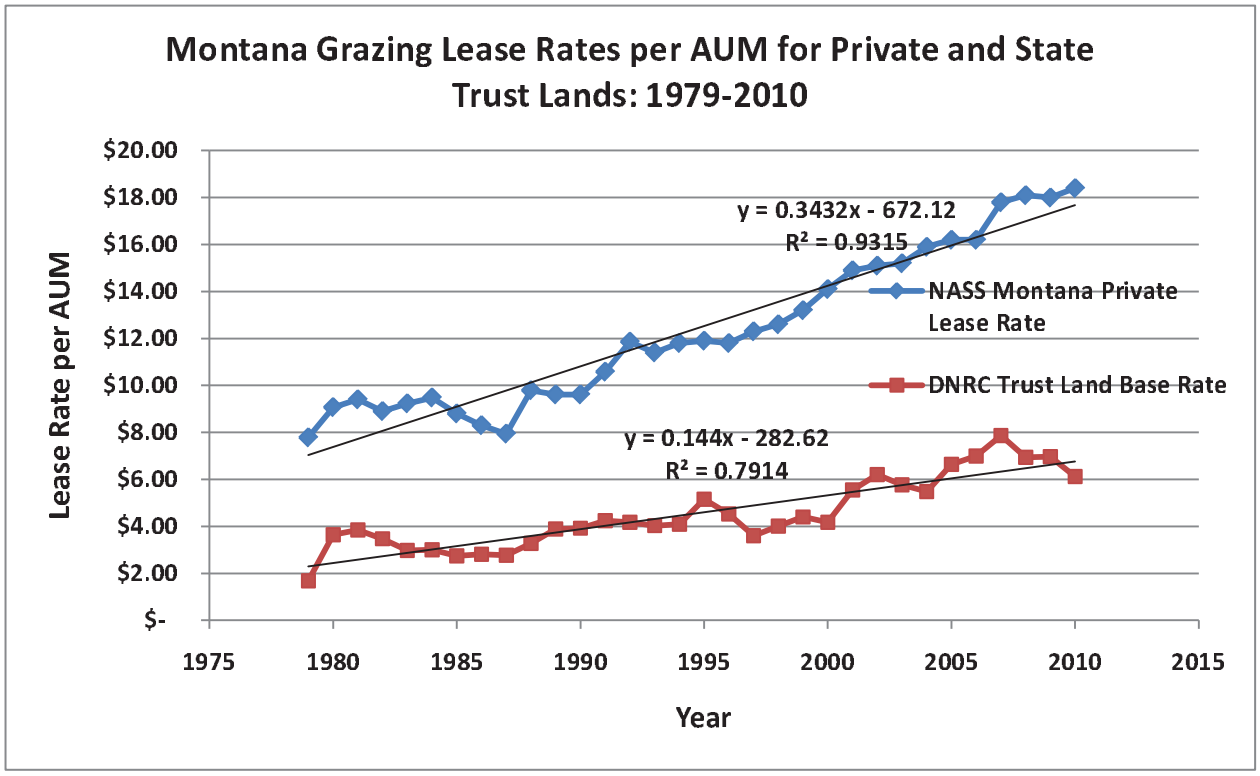

FIGURE 1. COMPARISON OF PRIVATE AND DNRC BASE GRAZING RATES FOR MONTANA: 1979-2010

1993 Hedonic Model Predicted Rate for "typical" State Trust Land Leases

The 1993 Montana grazing fee study utilized collected statewide grazing lease data to estimate a hedonic model of grazing rates in the state. This type of model was used to predict the fair market lease rate for a state trust land lease that had the characteristics of the "typical" state lease (no landowner provided services, and a lease term of > 5 years). The 1992 predicted fair market rate for a state lease reported by (Duffield and Anderson 1993) was $7.69 per AUM. This rate was 68% of the 1992 NASS private land lease rate for Montana. Using this relationship and current NASS private rates for Montana, leads to an estimated predicted fair market rate for state leases in 2010 of $12.56 per AUM.[3] The hedonic model explains the difference in private market and state lease rates

[3] This estimate is based on the assumptions that the underlying relationship between the true value of state and private leases has not change significantly over this period. Conversations with DNRC personnel indicate that the

one would expect if state leases were all competitively bid. A competitive market would price state leases at about 70% of the private lease average because state leases are longer term and provide no landowners services such as fencing and water improvements that are more typical in a private lease. (See Section 2 for more information on the hedonic model.)

Because the updated predicted state rate is directly proportional to changes in the NASS private rate, the percentage change in the predicted hedonic rate from 1992 to 2010 is the same as the actual change in the private rate, a 63% increase. The predicted state rate based on the hedonic model is 68% of the NASS private rate for both 1992 and 2010.

DNRC Competitively Bid Lease Rates

In 2011, DNRC reported that of an estimated 975,766 AUMs of trust land grazing leased, only about 5% of leases, constituting 46,339 AUMs had received competing bids, and thus were issued above the base lease rate of $6.23 per AUM. Duffield and Anderson in their 1993 statewide grazing survey and analysis found no significant differences in terms of land type and services provided between those state leases that received multiple bids and those that were issued to a single bidder. Figure 2 shows a comparison of average lease prices for competitively bid trust land grazing leases and for private grazing leases in Montana. Also shown in the figure are the estimated linear trendlines for the two series.

Annual inflation accounts for about 64 percent of the year to year variation in the average competitively bid lease rate per AUM. Over the 10 year period, average winning lease bids increased an average of 64 cents per AUM year over year. Clearly, as with the NASS private Montana grazing lease rates, the DNRC competitive bids have also seen a consistent upward trend in recent years. In constant dollar terms, competitively bid state leases have seen a modest upward trend from 2002-2010 while prices for private grazing in Montana have remained flat(see Appendix E).

The average price of the sub-population of state trust land leases that received competitive bids when awarded has grown substantially in nominal terms from 1992 to 2011. In 1992 the average rate for competitively bid leases was $8.34 per AUM. As of March 2011 this average rate was $14.28 per AUM. The average rate of the winning bids for competitive state leases increased 71% from 1992 to 2011. In 1992 the average competitive bid rate was 74% of the NASS private lease rate, and in 2010, this had increased to 78% of the private lease rate per AUM.

structure of state leases has remained generally unchanged in respect to the key factors incorporated in the hedonic model over the relevant years.

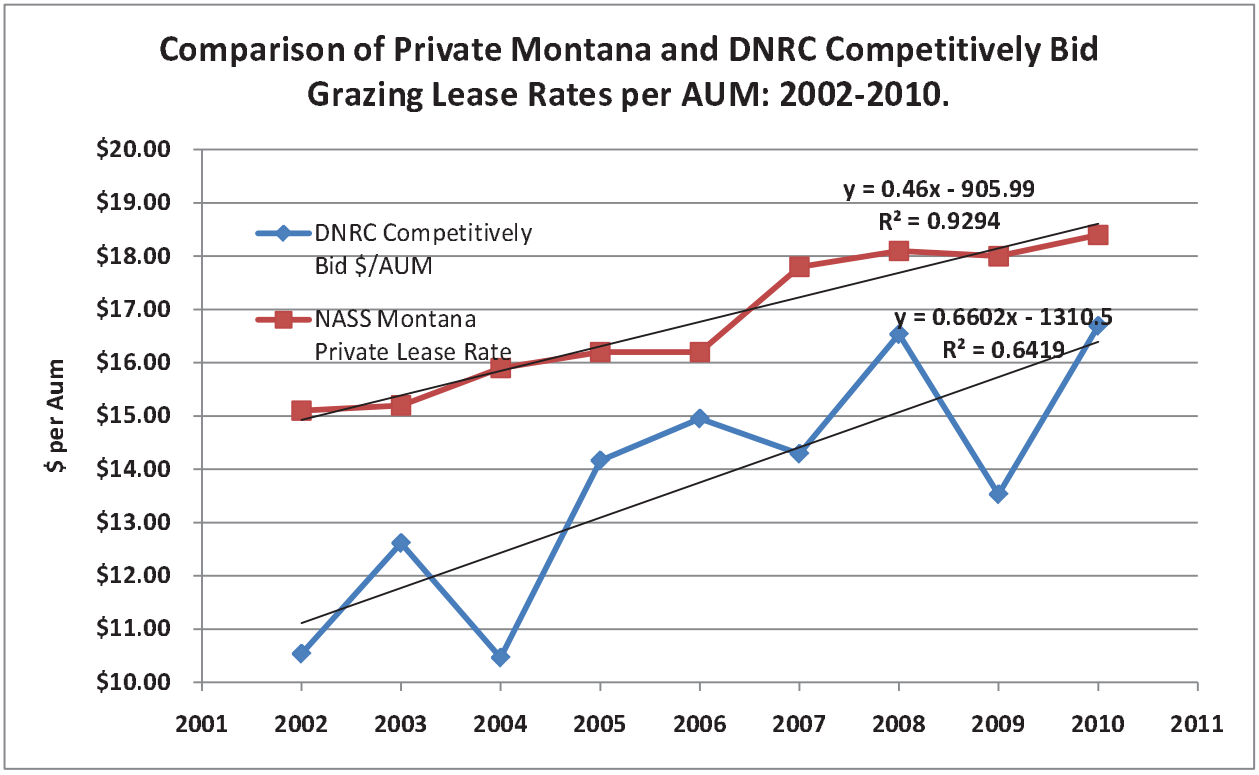

FIGURE 2. COMPARISON OF PRIVATE AND DNRC COMPETITIVELY BID LEASE RATES: 2002-2010

National Agricultural Statistics Service Montana Private Grazing Rates

Figure 3 shows the average private grazing lease rates for Montana and its surrounding states for the period 1979-2010. While there is substantial variation between the private lease rates in the five states, they all show a consistent trend of increasing rates over the period shown. Additionally, Montana rates are generally consistently higher than all but the South Dakota rates.

NASS-reported private lease grazing fees for Montana increased 63% from 1992 to 2010, from $11.27 to $18.40 per AUM.

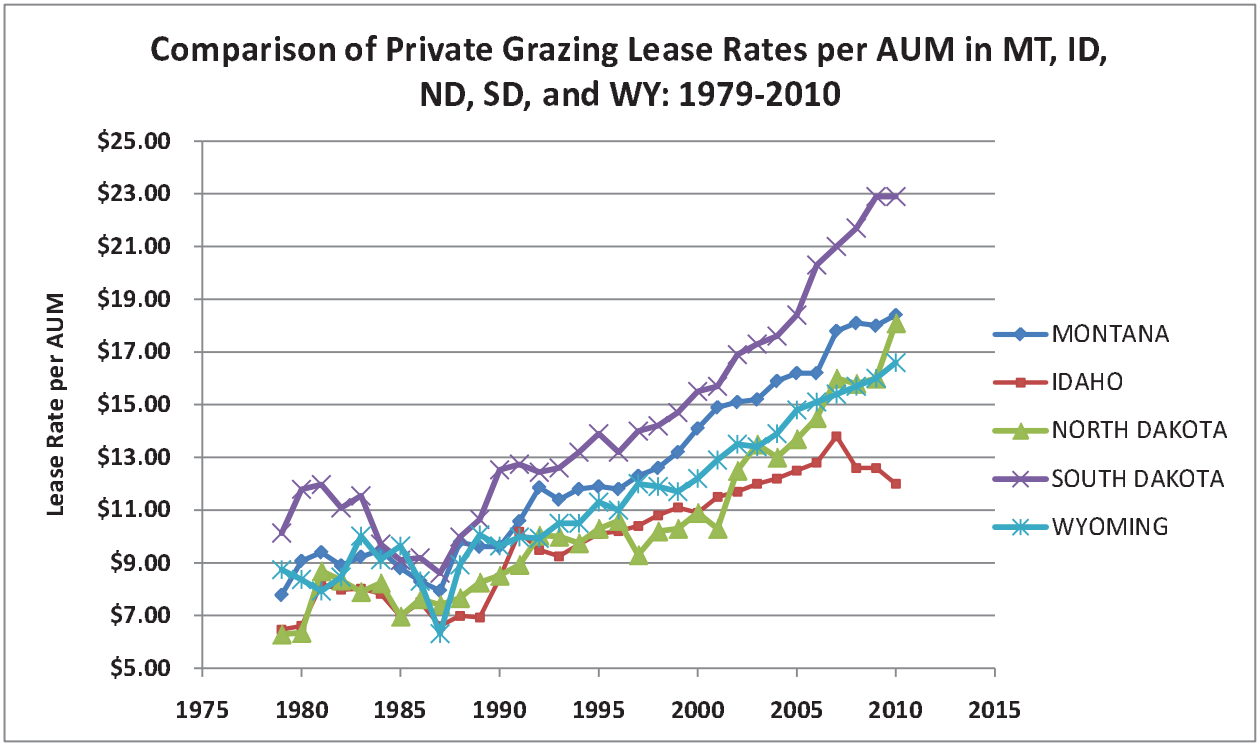

FIGURE 3. COMPARISON OF NASS PRIVATE GRAZING RATES FOR MONTANA AND SURROUNDING STATES: 1979-2010

Department of the Interior Montana National Wildlife Refuge Rates

The 1993 Montana grazing report did not include information on grazing rates for federal National Wildlife Refuges within the state. This information is now available, and provides a new benchmark for comparison to state lease rates. Currently the DOI-administered rates for Montana National Wildlife Refuges are based on the NASS private grazing rate (currently $18.40/AUM).[4] These leases differ from state leases in that they are one-year leases, and there is some landowner participation in land management costs and improvement (such as fencing) costs.

Bureau of Indian Affairs Montana reservation Land grazing Rates

The 1993 grazing report found an average lease rate for BIA-administered grazing lease in Montana of $8.37/AUM. The current average lease rate across the five reservations administered by the BIA Rocky Mountain Region is $18.65/AUM. This represents a 123% increase in estimated BIA lease rates per AUM from 1992 to 2010. In 1992 it was estimated that BIA rates were 74% of NASS private rates. In 2010 it is estimated that grazing rates on BIA-administered lands are on average

[4] The Montana DFWP also uses the NASS private grazing rate as an initial basis for setting grazing fees on state Wildlife Management Area lands. For new WMA leases, FWP charges the NASS rate unless either 1) the lessee is required to perform significant fence installation or maintenance (in which case the DNRC rate is charged, or 2) the lease is a component of a larger "exchange of use" agreement with the lessee (Per. Comm. Steve Knapp, Wildlife Habitat Section Supervisor, DFWP. April 14, 2011).

101% of private rates. BIA-administered grazing leases are similar in structure and services to state of Montana trust land leases.

Literature Review-Based Estimate of Fair Value Trust Land Leases

An additional perspective on a fair market rate was provided by Duffield and Anderson (1993) based on their review of the economics literature. New Mexico researchers (Torell, Ghosh and Fowler 1988) found that about 30% of the amount paid for private market grazing leases was for services (such as fencing, water, weed control). This suggests that (applying the New Mexico results to Montana) the fair market rate for state trust lands can be approximated as 70% of the NASS average private market rate. In 1992, 70% of the NASS private rate was $8.30 per AUM. In 2010, this value was $12.88 per AUM. No additional citations to this earlier work were identified in our literature review.

BLM and USFS (1978 PIRA) Rates

A final point of comparison is the federal grazing rate for 16 western states set annually by the BLM and USFS. This rate (set by formula) was $1.92/AUM in 1992 and is $1.35/AUM in 2011. The federal rate has been a source of considerable controversy, and today stands in stark contrast to other Montana rates such as the BIA and DOI (national wildlife refuge) rates. It appears that this rate is intended to provide a subsidy to the livestock industry and is not a reflection of the market value of these leases (GAO 2005).

TABLE 2. COMPARISON OF MONTANA GRAZING LEASE RATES PER AUM: 1992 AND 2010-11

Estimate/rate	1992	2010-11	% Change 1992-2010	% of Private 1992 Rate	% of Private 2010 Rate
(A) DNRC Base Rate	**$ 4.17**	**$ 6.23**	**149%**	**37%**	**34%**
(B) Private Rate (NASS)	**$ 11.27**	**$ 18.40**	**163%**	**--**	**--**
(C) Montana (DNRC) Specific Estimates					
(1) Hedonic model (typical state lease) Rate	**$ 7.69**	**$ 12.56**	**163%**	**68%**	**68%**
(2) DNRC Competitive Bids	**$ 8.34**	**$ 14.28**	**171%**	**74%**	**78%**
(3) Economics Literature Torell et al. (1988)	**$ 8.30**	**$ 12.88**	**155%**	**74%**	**70%**
(D) Federal Rates					
(1) CMR (DOI)	--	$ 18.40			100%
(2) BIA	$ 8.37	$ 18.65	223%	74%	101%
(3) BLM & USFS (1978 PIRA)	$ 1.92	$ 1.35	-30%	17%	7%

Conclusions and Recommendations

The 1993 Montana grazing study (Duffield and Anderson 1993) presented as its overall conclusion regarding the appropriate state trust lease rates the following:

> *"As a result of an intensive (and extensive) survey of Montana ranchers concerning grazing lease rates and four additional methods of analysis, we conclude that current state lease rates are much lower than current fair market value. Lease rates on Montana DSL grazing leases currently average $4.24 per AUM. The preceding analysis suggests that fair market value for these leases is on the order of $7.50 to $8.50 per AUM."* (Duffield and Anderson 1993, ES-7)

The 1993 analysis estimated that an appropriate level for state land lease rates in that year was between 66% and 75% of the NASS Montana average private lease rates.

The analysis presented in this report updates and expands on the 1993 study and results. Table 2 shows four alternative classes of Montana grazing lease fees. Class (A) is the DNRC base rate, Class (B) is the NASS private lease rate, Class (C) includes rates based on DNRC-specific data or estimates, and Class (D) includes federally set rates.

Probably the best estimate of the fair market rate for DNRC trust land grazing leases is the actual lease rate realized in the share of DNRC leases that are competitively bid. Accordingly, the longer term target for state grazing leases should be to move toward 75%-80% of the private market lease rate. For the near term, there is considerable empirical support for initially moving to a DNRC trust land grazing lease that is at least 70% of the private market rate. This is supported by the 1993 Montana hedonic model, the Torrell et al. (1988) study, and the DNRC leases that are competitively bid. There is even some evidence to support using 100% of the private market rate as in current BIA lease rates on Indian Reservations and DOI rates on federal National Wildlife Refuges in Montana. However, these federal leases sometimes provide more landowner services than state leases. The specific experience in Nebraska and Oklahoma with increased grazing rates is also supportive of the conclusion that Montana DNRC grazing rate should be substantially increased.

To conclude, for the near term, there is substantial empirical evidence that DNRC trust land grazing leases should be raised to at least 70 percent of the NASS-published average Montana private market rate in order to realize full market value on these assets.

Qualifications

This report was developed by Dr. John Duffield (Yale PhD. Economics 1974), Dr. David Patterson (University of Iowa, PhD. Statistics, 1983), and Mr. Chris Neher (MA Economics, University of Montana 1989). This research team's area of specialization within natural resource economics is the valuation of the services provided by market and nonmarket resources. Their prior most closely related work includes a suite of fair market value studies undertaken for the then, MT Department of State Lands in the early 1990s, including grazing leases, cropland, cabin rentals and recreation use. That work has since been relied on by the courts in several landmark cases, for example relating to cabin leases in Montana Supreme Court cases that have come to be known as *Montrust I*, and *Montrust II*. This research team also recently completed a study for Montana DNRC to develop methodologies to assess an annual lease fee, whereby State Trust Lands may be utilized for recreational purposes (Bioeconomics, Inc. 2010. Montana School Trust Lands Valuation Methodologies: Application to Whitefish School Trust Lands Neighborhood Plan.) Other closely related work includes serving as the economics expert witness for the Montana Attorney General in PPL Montana, LLC v. State of Montana. In that case the district court relied on Dr. Duffield's theory and findings of facts with respect to the fair market rental for hydropower use of state trust lands. Other related work includes assisting the Montana Natural Resource Damage Program over the last 20 years in valuation of foregone recreation values and groundwater services in the context of the Clark Fork Superfund cases (Montana v. Arco) as well as similar issues recently resolved (2008) concerning the Mike Horse Dam and E. Helena smelter, all of which resulted in significant settlements for the state.

1.0 INTRODUCTION

This report, by Bioeconomics, Inc. of Missoula, Montana, has been prepared under contract number 115380 CSO with the State of Montana Department of Natural Resources and Conservation. The primary task associated with this contract is to:

> "Furnish DNRC with a report that estimates the statewide fair market rental rate for Montana state grazing leases given the terms and characteristics of those leases. The estimated fair market value rental rate must be made on a per animal unit month (AUM) basis.
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> The contractor shall also review the current economic literature to identify other recent studies that may relate to the issue."

This report is organized as follows:

> Section 1: Provides introduction to the problem addressed and the methods and data sources used in the analysis.
>
> Section 2: Provides a discussion of the existing literature on Grazing lease values, and previous work on valuing State of Montana trust land grazing leases.
>
> Section 3: Presents data and other information available since 1993 used to inform the analysis.
>
> Section 4: Presents the core analysis of data-supported State of Montana trust land grazing lease Base rates.
>
> Section5: Provides the authors' recommendations for the appropriate methods and levels associated with setting base grazing lease rates for trust lands.

Section 6: Discusses limitations of the preceding analysis and the likely sensitivity of proposed lease rates to alternative assumptions.

1.1 Sources of Data

The current analysis takes as its starting point the report for the Montana Department of State Lands in 1993 on the fair market value for state land grazing leases (Duffield and Anderson 1993). This report provided a discussion of recent studies on grazing lease prices and valuation as well as extensive analysis based on original data collected on a broad spectrum of grazing leases in the State of Montana.

The results and conclusions from the 1993 DSL study have been augmented and updated in the current report using a number of sources of data, including:

1. U.S. Department of Agriculture, National Agricultural Statistics Service data on statewide average private grazing fee rates (USDA National Agricultural Statistics Service 2011)
2. Montana DNRC lease rate data
3. Bureau of Indian Affairs grazing lease rates data for Montana reservation lands
4. CM Russell NWA grazing lease rate data.

The following analysis utilizes the above information and data on grazing lease rates in the state of Montana to estimate a current (2011) lease rate for Montana trust lands on a per AUM basis, that is consistent with

1.2 Overview of Montana State School Trust Lands

Through the Enabling Act of February 22, 1889, the Congress of the United States gave to the State of Montana two sections of land from every township for common school support. The Enabling and other acts also granted acreage for other educational and state institutions. The original common school grant was for 5,188,000 acres. The additional acreage provided for other endowed institutions included 668,720 acres, for a total of 5,856,720 acres. The total acreage fluctuates through the years due to land sales and acquisitions.[5]

Any proceeds from the sale and permanent disposition of trust lands, or part thereof, must become permanent funds for the support and maintenance of the public schools and the various state institutions for which the lands had been granted. Any rentals received on leased lands,

[5] The discussion of Montana School Trust Lands is adapted from http://dnrc.mt.gov/trust/about_us/overview.asp . The DNRC website provides additional information on the location of trust lands statewide and the beneficiaries of the trust.

interest earned on the permanent funds arising from these lands, interest earned on deferred payments on lands sold, and all other actual income shall be available for the maintenance and support of the beneficiary schools and institutions.

Approximately 8,500 agreements include grazing use of trust lands. The 4.07 million acres of classified grazing lands and forest lands have an estimated carrying capacity of 975,766 animal-unit-months (AUMs). The minimum rental rate for 2011 of $6.23/AUM for grazing leases is set annually by a formula which includes the average weighted price for beef cattle sold in Montana during the previous year. In FY 2010, grazing leases generated $6,483,884.

The purpose of the DNRC Trust Land Management Division (TLMD) is to administer and manage the state trust timber, surface, and mineral resources for the benefit of the common schools and the other endowed institutions in Montana, under the direction of the State Board of Land Commissioners. The board consists of Montana's top elected officials.

As was done in the 1993 report, the central question examined in this report is whether the current lease rate returns a "full market value" to the school trust as required by the Montana Enabling Act of 1889 and by the Montana Constitution of 1972.

2.0 PREVIOUS RESEARCH AND REVIEW OF THE LITERATURE ON GRAZING LEASE VALUATION

The 1993 Montana grazing fee study detailed the key literature to that date on grazing lease fees in the western US. Most of the literature in this area has focused on setting fees on federal lands (Torell and Doll 1991) (Workman 1988) (Borman 1990). Work cited specific to grazing fees on state lands included a study of rangeland conditions in Colorado (Rouse 1991) and policy studies emphasizing differences in grazing land management and fee strategies across states (Bartlett 1983) (J. Souder 1990) (Souder and Fairfax, The State School Trust Lands 1990) (Souder and Fairfax 1991).

Since the 1993 Montana grazing fee report analysis and studies on Federal grazing fees has continued to focus largely on federal grazing fees (for example, (L. R. Torell 2003)).

What was true in 1993 continues to be true today. Private grazing leases are priced at much higher rates on average than fees on much public ground (including Montana State trust lands). This has led to the general perception that many public leases are underpriced. The minimum (base) trust land lease rate in Montana in 2010 was $6.12 per AUM while the average private grazing lease for the year was $18.40 per AUM (USDA National Agricultural Statistics Service 2011).

The basis for annual data on private market lease rates is the July Cattle Survey implemented by the Agricultural Statistics Service in each state (including Montana). The survey basically asks the respondent to "report" what the average private grazing lease rate is in their area. There are two limitations to this data as far as providing a basis for determining a fair market value on public lands. First, the question does not ask the person to identify actual transactions but "to recall or speculate on values" (U.S. Department of Agriculture and the Department of Interior 1992). Secondly, it is not obvious that the terms, conditions of the land, and services provided on the average private lease correspond to the average public lease. For example, if the average public lease does not include important services which affect the cost and productivity of holding the lease (such as who pays for fencing, water improvements, etc.), the fair market value for these leases may in fact be below the market average.

Despite limitations associated with the NASS-published private grazing rate estimates, these estimates have been increasingly accepted by agencies such as the Department of Interior, for setting public land lease rates on national wildlife refuge grazing lands.[6] Additionally, the Bureau of Indian Affairs uses a market analysis for many Montana reservations to set minimum grazing fees for the competitive bidding process. These market-based minimum rents for BIA administered Montana

[6] Personal Communication, Bill Berg, C.M. Russell NWR. March 17, 2011

reservation grazing lands currently are on average approximately equal to the NASS private 2010 lease rate for the state.[7]

A comprehensive review of these issues is provided by a report of the Secretaries of Agriculture and Interior to the U.S. Congress in 1986, entitled "Grazing Fee Review and Evaluation". This study was updated in April, 1992. As discussed in this report, federal fees are based on the so-called PRIA formula. The PRIA formula is: Calculated Fee = $1.23 x (FVI + BCPI-PPI)/100 where $1.23 is the base price from a survey in 1966, FVI is a the Forage Value Index (based on the July Cattle Survey index of annually surveyed private grazing land lease rates with 1964-1968=100), BCPI is a beef cattle price index and PPI is an index of prices that livestock producer costs. This formula generates very low fees at present because it includes the factor to take account of producer costs, which have been generally increasing.

2.1 Overview of Montana DSL 1993 Report Methods and Conclusions

The following discussion presents the key results and conclusions from the 1993 Montana grazing fee study. Section 3 of this applies current grazing rate data published since the 1993 report to update and expand on the 1993 findings.

2.2.1 1993 Hedonic Model of Montana Grazing Lease Rates

One approach to identifying the full market lease rate for state trust land grazing leases is to identify how similar leases are valued in the private market. Like many commodities, such as automobiles, the value of grazing leases depends on the characteristics of the lease. In an hedonic model the price of a commodity is explained as a function of the commodity's characteristics; for example, car prices are a function of horsepower, size of the vehicle, and various amenities such as power steering and high quality interiors. This is a widely applied economic tool to explain price differences for market commodities (Rosen 1974). State leases are known to differ from the average private market lease in that they are longer term and no landowner services are provided such as fencing or water improvements. Duffield and Anderson (1993) developed a model to explain how private market lease rates (using data on actual Montana private leases) vary depending on the term and other factors such as landowner services. Based on this model, it was found that the full market value for state leases was 70% of the average private market lease rate.

[7] The current average minimum bid across the Ft. Peck, Ft. Belknap, Crow, Northern Cheyenne, and Blackfeet reservations is $18.65. It should be noted that this is the average minimum bid for the leases and not the average lease rate, which would be higher for competitively bid leases. Personal Communication, Dave Hopkins, BIA-Rocky Mountain Regional Office. March 17, 2011.

The final estimated hedonic price model for explaining observed differences in Montana private AUM lease rates is shown in Table 3. This estimated model explains AUM prices in terms of location (Whether the lease was located in Districts 30 or 50), services provided by the lessor (such as fence and water development costs), land type (if irrigation is available), lease terms (if the lease is for > 5 years), and whether the lease had been held for one year or less (hereafter called "New Lease"). Other characteristics of the leases such as whether the lease was an inholding on a larger ranch, whether there were noxious weed problems, or location of the leases in districts besides 30 and 50 were not found to have any statistically significant predictive power in the estimated model.. The explanatory variables in the model were generally significant at the 99% confidence level, with the exception of District 30, and New Lease, which were significant at the 90% level.

TABLE 3. FINAL REDUCED HEDONIC AUM LEASE RATE MODELS: (DUFFIELD AND ANDERSON 1993)

Variable[8]	**Reduced Model**	
	Coefficient	t-statistic
Intercept	9.548	(28.14)
District 30	-0.855	(-1.81)
District 50	1.60	(3.72)
New Lease	0.752	(1.95)
Terms	-1.94	(-2.58)
Fence Maintenance	1.437	(3.90)
Water Development	0.954	(2.66)
Land Type	1.747	(2.76)
Adj R^2	0.268	
Sample Size	219	

The estimated model explained about 26.8% of the observed variability in lease prices. District 30 tended to be less expensive, and District 50 more expensive. All other things being equal, leases in

[8] DISTRICT 30 and 50= dummy variable 0/1, coded 1 if lease is located in a given district , 0 otherwise.
WATER DEVELOPMENT= Landowner participation in water development costs. Dummy variable coded 1 if landowner contributes to development and 0 otherwise.
NEW LEASE= Dummy variable coded 1 if lease held for 1 year only, and 0 if lease has been held for more than one year.
TERMS= Dummy variable coded 1 if lease terms are more than 5 years, and 0 if less than or equal to 5 years.
FENCE MAINTENANCE= Landowner participation in fence maintenance costs. Dummy variable coded 1 if landowner contributes to development and 0 otherwise.
LAND TYPE= Dummy variable, coded as dummy 1 if lease is irrigated, and 0 if subirrigated or dryland lease.

District 30 were lower by -$0.86/AUM and District 50 was more expensive by +$1.60/AUM. All other things being equal, lessor participation in services resulted in higher lease prices. Contribution to water development, either materials, labor, or a combination of costs added +$0.95/AUM. Similar participation in fence maintenance added +$1.44/AUM to the lease price. Irrigated leases added an additional $2.27/AUM to the lease rate. Recently negotiated leases, held one year only, were more expensive by $0.75/AUM, and leases with terms exceeding 5 years were less expensive by -$1.94.

One would expect many other variables such as inholding status, lease acreage, productivity, operating expenses, etc. to play a determining role in AUM lease prices. These variables are not present in the multivariate model reported by Duffield and Anderson (1993) because they do not add any additional explanatory power to the model given the presence of district, water development, irrigation, the lease held one year variable, fence maintenance, and lease terms.

2.2.2 1993 Predicted Fair Market Grazing Rates for State Trust Land Leases

The 1993 hedonic model for AUM price derived from the private lease sample was used to predict AUM prices for state leases in the sample.

The estimated hedonic model indicated that state leases were generally underpriced relative to private leases of comparable quality. State leases in the 1993 data base averaged $4.74/AUM. The hedonic model predicted an average market value for all state leases to be $8.16, and for the "typical" state lease to be $7.69/AUM.[9] The 1993 report concluded that state leases were on average significantly underpriced relative to full market value for those leases.

2.2.3 Summary of 1993 Grazing Report Findings and Conclusions

In addition to using the estimated hedonic model of Montana grazing lease rates to predict the fair market value of state grazing leases, the 1993 report also included a number of grazing rate benchmarks from both their survey of Montana ranchers and other sources as well. Table 4 shows the full summary of comparable estimates of fair market grazing rates from the 1993 report. Four specific approaches are shown to estimate a fair market value for state grazing leases. Estimate one is based on a statistical model (a so-called "hedonic model") that relates lease characteristics and terms to price for private market grazing leases. Lease characteristics that could influence price include the term (number of years) of the lease, whether the lease is a newly held lease, provision of fencing maintenance and other services by the landlord, whether the lease is irrigated or dryland and region the lease is located in (e.g. central versus northeast Montana). The latter factor is included to account for differing market conditions across the state.

[9] The 1993 report defined the "typical" state lease to include no services, be dryland, have a 10 year lease, and to have been held for more than one year. In 1993, approximately 76% of state leases were considered "typical" under these conditions.

This model was used to predict the market value of leases with characteristics similar to the typical state lease (no landlord provided fencing or water development services, terms greater than five years, not newly held, and dryland). For the "typical" state lease the specific estimate of fair market value is $7.69. Based on the estimated confidence interval for this predicted value, one can be 95 percent sure that the true mean is between $6.23 and $9.14. This range reflects the uncertainty in the parameters of the model and how close the values of the explanatory variables used in the prediction are to the means of these variables in the sample of private leases.

These prices based on the hedonic model are somewhat lower than the average market price because state leases are less likely to be on irrigated land and generally offer much lower levels of landlord services with regard to fencing and water. Additionally, state leases are much more likely to have been held for more than one year and are for a longer term.

A second way to estimate a market value of state leases is to look at the average competitive bid for the 8% of all state school land grazing leases which were competitively bid in 1993. Leases which were competitively bid were not significantly different from other state leases regarding services and land type. The average competitive bid for state leases in 1992 was $8.34, based on a sample of all 613 competitively bid state leases in that year.

A third approach used was to examine what other public land management agencies charge for private grazing leases. The 1993 study noted that BLM and Forest Service lease rates are set by formula (at $1.92 for the study year) and do not provide useful information on the forage lease market. However, Bureau of Indian Affairs (BIA) leases do appear to represent market leasing rates. According to BIA personnel, BIA leases are determined by competitive bid and negotiation. In a sample of 32 BIA leases in 1992, the average lease was at $8.37 and the range was from $5.85 to $14.00. These leases are similar to state leases in that they typically have few landlord services. In May 1992, the BIA issued an appraisal for leases on the Fort Peck Reservation. The appraiser, Anita Bauer, reported that through a phone survey she identified 17 useable private leases both on and off the Fort Peck Reservation. The average market price where landlord provided all the livestock care was $11.00/AUM and where the tenant provided all the care the average price was $8.35/AUM.

A final perspective on a fair market AUM-based price was provided by Duffield and Anderson through a literature review. Torell, et al., did a study of the value of public grazing leases in New Mexico (Torell, Ghosh and Fowler 1988). The study found that about 30% of the private market lease rate was for services. Accordingly, they suggest that the value of forage on public leases (at least for New Mexico) is appropriately given by taking 70% of the private market lease rate for non-irrigated lands. Assuming that this ratio holds for Montana, and applying it to the dryland private reference price in Table 4 (at $11.27/AUM) yields an estimate of the value of state grazing leases in Montana at $7.89.

These four methods tend to lead to a fair market value for state grazing leases that is around 70% of the private dryland lease rate. All the estimates are bracketed by the fairly narrow range of $7.69 to $8.37. This evidence suggests a fair market price of between $7.50 and $8.50, with a point estimate of $8.00 for Montana State trust land grazing leases in 1993.

TABLE 4. Summary Of Alternative Estimates Of Fair Market Value For Montana State Lands Grazing Leases (1992 Dollar/AUM Basis). (DUFFIELD AND ANDERSON 1993)

Estimate	Mean $/AUM	95% Confid. Interval	Standard Error	Sample Size	Percent of private dryland
A. Private market reference prices.					
Dryland private leases	11.27	10.89 - 11.65	0.196	207	100
B. Estimates of fair market value for Montana state grazing leases.					
1. Hedonic model "typical state lease" (no services, term > 5 years)	7.69	6.23 - 9.14	0.740	139	67
2. Competitive bids for state grazing leases.	8.34			613	73
3. BIA Montana Leases	8.37	7.63 - 9.11	0.380	32	74
4. Literature review: (Torell, Ghosh, and Fowler, 1988) ratio of public lease forage value to private	7.89	7.62 - 8.16	0.137	207	70

Note: Standard error for estimate 5. assumes the ratio .70 is a known constant.

3.0 UPDATED DATA RELEVANT TO ANALYSIS

This section uses data from 1993-2011 to update and expand upon the results from the 1993 report show in Table 4. Updated data is now available on:

1. The National Agricultural Statistic Service estimated average dryland private grazing lease rate per AUM for Montana (as well as for surrounding states)
2. The current lease rates for the sample of Montana trust land grazing leases that are competitively bid (not issued at the minimum rate)
3. Current minimum lease rates for BIA-administered grazing leases on Montana reservations

Additionally, new information is available on grazing lease rates set by the Department of the Interior for grazing lands contained within Montana national wildlife refuges.

This section provides updated estimates of the current predicted fair market rates based on applying the 1993 hedonic model results to current levels of private lease rates in the state. Finally, the literature-based estimate of state trust land values (Torell, Ghosh and Fowler 1988) is updated using the most recent 2010 private lease rates for Montana.

3.1 National Agricultural Statistics Service Private Grazing Fees

The 1993 Montana grazing report utilized several sources of data to construct a time series of private grazing rates in the state. The NASS data only provided 14 years of consistent information on private lease rates in 1993. Today that data series has been extended to include 31 years of data.

Table 5 shows the average private grazing lease rates for Montana and its surrounding states for the period 1979-2010. While there is substantial variation between the private lease rates in the five states, they all show a consistent trend of increasing rates over the period shown. Additionally, Montana rates are generally consistently higher than all but the South Dakota rates (Figure 4).

Private land grazing lease rates are important to the analysis of determining the fair market value of state leases for a number of reasons. First, the 1993 Montana grazing survey data and analysis confirmed that the NASS private rates for that year corresponded closely to the reported actual average Montana private lease rates (based on a statewide sample of 243 private lessees and lessors). The NASS private lease rates, therefore, provide a consistent benchmark of how full market value grazing leases in the state have varied over time. A second characteristic of the NASS reported lease rates is that these rates have been adopted by the Federal government for setting minimum grazing rates on national wildlife refuges in the state.

TABLE 5. PRIVATE GRAZING FEE RATES PER AUM FOR NON-IRRIGATED LAND: 1979-2010. (SOURCE: JOE SAMSON, STATISTICIAN USDA/NASS ECONOMICS SECTION, PERS. COM. MARCH 14, 2011)

Year	MONTANA	IDAHO	NORTH DAKOTA	SOUTH DAKOTA	WYOMING
1979	**$ 7.78**	$ 6.47	$ 6.29	$ 10.13	$ 8.74
1980	**$ 9.07**	$ 6.61	$ 6.35	$ 11.79	$ 8.37
1981	**$ 9.40**	$ 8.20	$ 8.69	$ 11.97	$ 7.93
1982	**$ 8.90**	$ 7.98	$ 8.34	$ 11.09	$ 8.46
1983	**$ 9.23**	$ 8.02	$ 7.90	$ 11.54	$ 10.02
1984	**$ 9.48**	$ 7.83	$ 8.23	$ 9.71	$ 9.12
1985	**$ 8.80**	$ 6.97	$ 6.97	$ 9.10	$ 9.64
1986	**$ 8.30**	$ 7.51	$ 7.63	$ 9.19	$ 8.31
1987	**$ 7.94**	$ 6.60	$ 7.41	$ 8.61	$ 6.31
1988	**$ 9.79**	$ 6.99	$ 7.67	$ 9.98	$ 8.93
1989	**$ 9.61**	$ 6.93	$ 8.26	$ 10.65	$ 10.06
1990	**$ 9.61**	$ 8.42	$ 8.52	$ 12.53	$ 9.64
1991	**$ 10.58**	$ 10.18	$ 8.93	$ 12.74	$ 9.98
1992	**$ 11.86**	$ 9.49	$ 10.04	$ 12.44	$ 9.93
1993	**$ 11.40**	$ 9.25	$ 10.00	$ 12.60	$ 10.50
1994	**$ 11.80**	$ 9.70	$ 9.75	$ 13.20	$ 10.50
1995	**$ 11.90**	$ 10.10	$ 10.30	$ 13.90	$ 11.30
1996	**$ 11.80**	$ 10.20	$ 10.60	$ 13.20	$ 11.00
1997	**$ 12.30**	$ 10.40	$ 9.30	$ 14.00	$ 12.00
1998	**$ 12.60**	$ 10.80	$ 10.20	$ 14.20	$ 11.90
1999	**$ 13.20**	$ 11.10	$ 10.30	$ 14.70	$ 11.70
2000	**$ 14.10**	$ 10.90	$ 10.90	$ 15.50	$ 12.20
2001	**$ 14.90**	$ 11.50	$ 10.30	$ 15.70	$ 12.90
2002	**$ 15.10**	$ 11.70	$ 12.50	$ 16.90	$ 13.50
2003	**$ 15.20**	$ 12.00	$ 13.50	$ 17.30	$ 13.40
2004	**$ 15.90**	$ 12.20	$ 13.00	$ 17.60	$ 13.90
2005	**$ 16.20**	$ 12.50	$ 13.70	$ 18.40	$ 14.80
2006	**$ 16.20**	$ 12.80	$ 14.50	$ 20.30	$ 15.10
2007	**$ 17.80**	$ 13.80	$ 16.00	$ 21.00	$ 15.40
2008	**$ 18.10**	$ 12.60	$ 15.80	$ 21.70	$ 15.70
2009	**$ 18.00**	$ 12.60	$ 16.00	$ 22.90	$ 16.00
2010	**$ 18.40**	$ 12.00	$ 18.10	$ 22.90	$ 16.60

In 2010, the average private grazing rate for the state of Montana reported by NASS was $18.40 per AUM

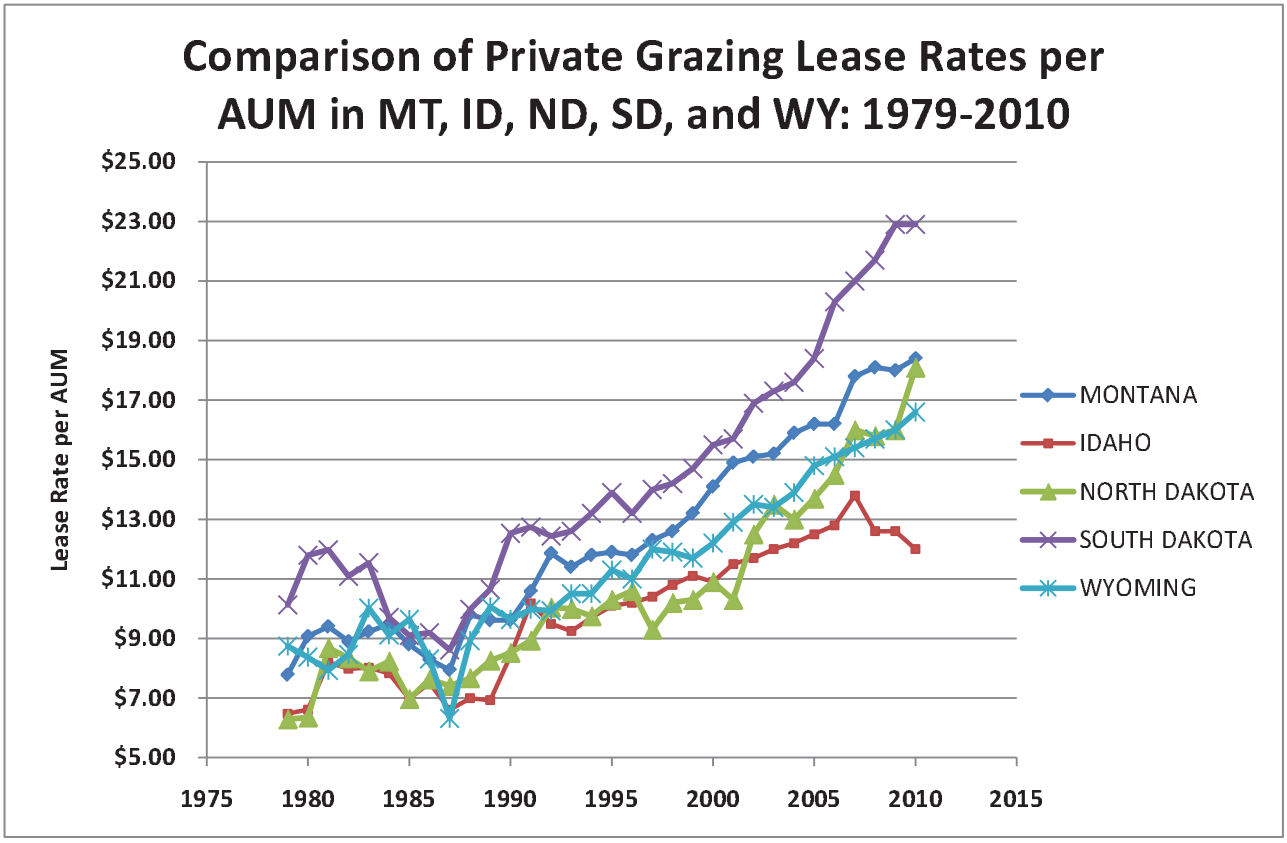

FIGURE 4. COMPARISON OF NASS PRIVATE GRAZING RATES: 1979-2010

3.2 U.S. Department of the Interior Grazing fees for CM Russell NWR

The 1993 Montana grazing study did not include information on fee levels charged for grazing leases on Federal national wildlife refuges in the state. Conversations with refuge personnel at C.M. Russell NWR confirm that minimum lease rates are set by the Department of Interior for all grazing leases on refuge lands within Montana. For the past several years that rate has been the NASS-published Montana statewide average private lease rate. Currently the refuge lease rate for Montana is $18.40/AUM.

Leases on refuge lands in Montana are one-year leases issued at the discretion of the refuge. Services provided by the landowner include provision of fencing materials, and at some refuges, allowance on the lease rate for costs associated with weed control.[10]

[10] Personal Communication, Bill Berg, C.M. Russell NWR. March 17, 2011

3.3 Bureau of Indian Affairs Grazing Fees for Montana Reservations

The 1993 Montana grazing report included estimated grazing rates for BIA-administered leases in the state. This estimate was based on 74 BIA leases included in the statewide survey data collected for the study. Additional information from the Fort Peck Reservation for the study confirmed the general range of BIA lease rates at approximately $8.37 per AUM.

In recent years the BIA has conducted reservation-specific appraisals of fair market grazing rates in Montana. These fair market values are then used as a basis to set the minimum bid levels for BIA leases. Table 6 shows the current BIA base lease rate per AUM for the 5 Montana reservations in the BIA Rocky Mountain Region. Actual lease rates for many leases on these reservations are for more than the minimum rate reported.

The structure of BIA leases is quite comparable to Montana trust land leases, in that the landowner generally provides no services such as fencing, water development, and weed control. Therefore, one would expect competitively bid BIA leases with minimum bid levels that are based on market appraisals to provide a good, comparable benchmark for the fair market value of state trust grazing leases.

A simple average of the five reservations shown in Table 6 leads to a base grazing fee of $18.65 per AUM. It should be noted that while market appraisals are the initial basis for BIA setting base rates, the rate of $25/AUM for the Crow Reservation was set by the Tribe.

TABLE 6. BUREAU OF INDIAN AFFAIRS MINIMUM REPORTED GRAZING LEASE RATES, BY RESERVATION.

Reservation	BIA Base Rate/AUM
Blackfeet	$ 18.50
Crow	$ 25.00
Ft. Belknap	$ 19.00
Ft. Peck	$ 15.75
N. Cheyenne	$ 15.00
5-Reservation Average	**$ 18.65**

3.4 DNRC Competitively Bid Trust Land Leases

The 1993 Montana grazing study reported the subsample of State of Montana trust land leases that were competitively bid (not issued at the minimum rate) had an average lease value of $8.34/AUM. These competitively bid leases constitute less than 10% of all trust land leases in the state. The 1993 report found that those leases that were competitively bid were not significantly different from other state leases as for as services and land type. Table 7 shows the 2011 summary of competitively bid leases by county. The current average lease value for this subsample of state leases is $14.28/AUM.

TABLE 7. MONTANA DNRC COUNTY-LEVEL STATISTICS FOR COMPETITIVELY BID TRUST LAND GRAZING LEASES.

County	Average of $/AUM	Sum of AUMs	Sum of Acres
Beaverhead	$18.72	939	3,782
Big Horn	$26.02	187	817
Blaine	$15.35	1,155	3,903
Broadwater	$10.50	155	782
Carbon	$13.57	936	4,186
Carter	$15.77	587	2,878
Cascade	$16.35	1,474	6,112
Chouteau	$12.16	1,857	7,770
Custer	$15.14	4,974	23,898
Daniels	$12.88	365	1,263
Dawson	$17.48	340	1,677
Deer Lodge	$6.94	75	256
Fallon	$12.25	573	2,019
Fergus	$14.25	3,495	14,111
Flathead	$10.10	565	2,962
Gallatin	$16.34	1,099	3,799
Garfield	$12.49	850	4,319
Glacier	$11.77	169	701
Golden Valley	$15.13	185	833
Granite	$14.17	184	872
Hill	$15.03	1,038	3,899
Jefferson	$24.00	455	2,290
Judith Basin	$14.47	1,230	3,703
Lake	$9.57	298	1,869
Lewis and Clark	$21.93	3,318	13,562
Liberty	$17.26	382	1,129
Lincoln	$14.12	152	602
Madison	$16.46	732	2,413
McCone	$14.48	1,013	3,284
Meagher	$22.49	208	857
Missoula	$12.25	1,403	30,418
Musselshell	$11.29	467	2,018
Park	$14.92	521	1,515
Petroleum	$8.10	134	800
Phillips	$11.25	1,746	6,696
Pondera	$19.90	828	3,197
Powder River	$13.06	542	2,708
Powell	$8.73	369	2,560
Ravalli	$15.92	380	1,279
Richland	$13.19	448	1,465
Roosevelt	$14.77	625	2,586
Rosebud	$7.53	869	3,923
Sanders	$8.59	323	2,094
Sheridan	$11.35	293	1,025
Silver Bow	$23.58	106	798
Stillwater	$12.38	692	2,686
Sweet Grass	$13.62	1,181	4,405
Teton	$24.70	1,240	4,569
Toole	$10.31	855	2,931
Treasure	$9.00	297	1,583
Valley	$14.65	1,413	6,807
Wheatland	$16.98	490	2,049
Wibaux	$20.90	576	2,318
Yellowstone	$15.60	1,551	6,297
Total	**$14.28**	**46,339**	**217,270**

4.0 ADDITIONAL ANALYSIS OF TRUST LAND GRAZING LEASE RATES BASED ON UPDATED DATA

Section 3, above, provided updated point estimates of several of the Montana grazing rate comparisons discussed in the 1993 Montana grazing report. This section expands on those point estimates by analyzing and discussing similarities and differences among different grazing lease rates in the state within the context of relationships and changes over time. Three perspectives on these relationships are presented:

1. The relationship over time between NASS-published private grazing rates, and the Montana trust land base rate per AUM,
2. The trend in DNRC competitively bid grazing rates over time, and
3. Comparisons of changes in all available grazing rate data between 1993 and 2010/11

4.1 Analysis of Differences between Montana DNRC Base lease Rates per AUM and NASS Private Average Rates per AUM

Consistent data series are available for both the private grazing fee rates published annually by NASS (APPENDIX D), and the base rental rate for Montana trust grazing land (APPENDIX A). Figure 5 shows a graph of those respective rates for the period 1979-2010.

A comparison of the two data series and their respective trendlines points out two clear and consistent differences between the rates over the time period. First, as noted in the 1993 report, the NASS private grazing fee rate is substantially higher than the DNCR base rate throughout the time period.[11] Additionally, the annual increase in the average private grazing fee is more than double that of the DNRC base rate.[12] The combination of these two trends results in a persistent gap between private and state grazing rates that increases over time. The implication is that state grazing fees on average are falling further and further behind benchmark fair market rates over time.

[11] Over the 1979-2010 period the private rate per AUM reported by NASS averages 281% of the DNRC base rate per AUM.

[12] The 1979-2010 private grazing fee per AUM for Montana increases by an average of 34.3 cents per year (95% C.I. 30.9 to 37.8 cents), while the DNRC base rate increase at an average 14.4 cents per AUM per year (95% C.I. 11.6 to 17.2 cents)

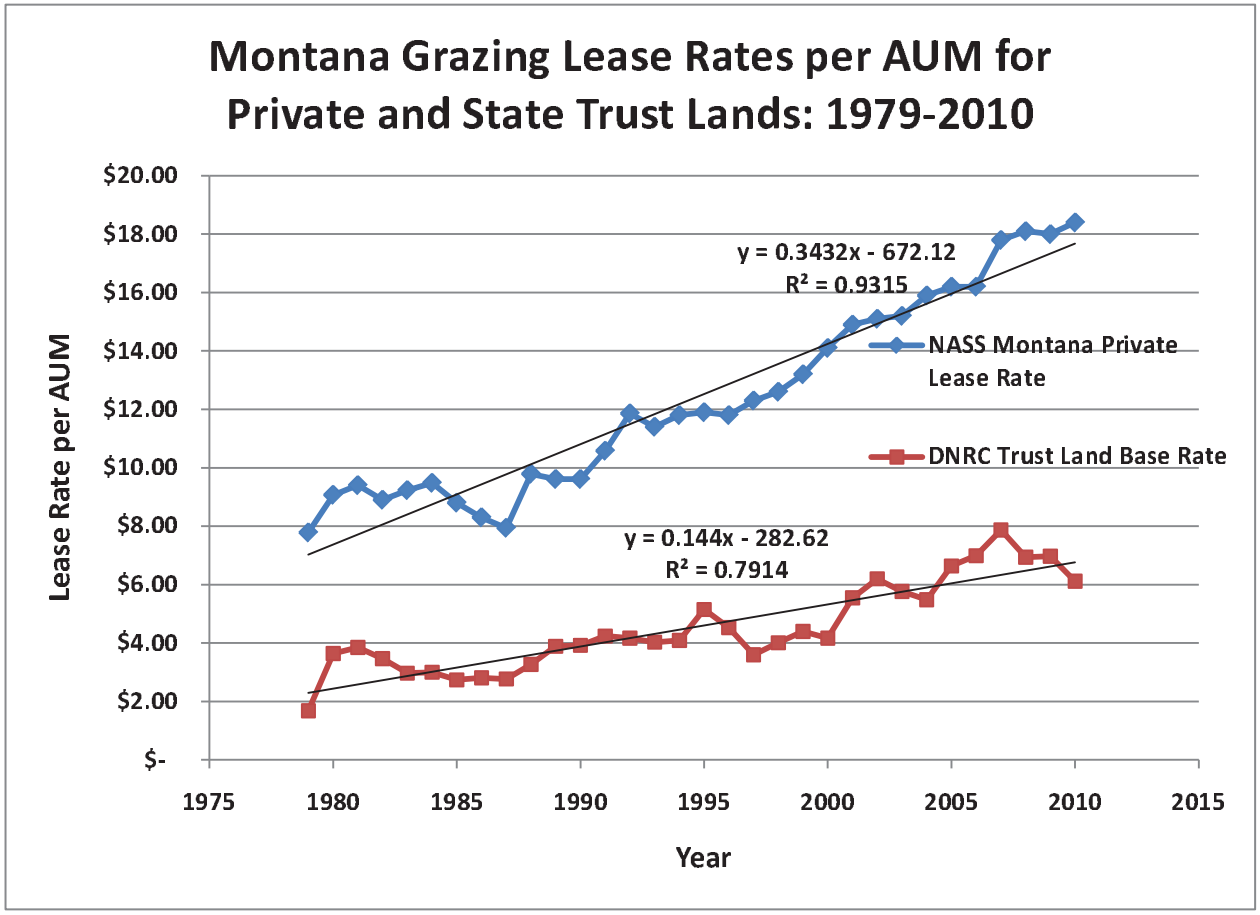

FIGURE 5. MONTANA GRAZING LEASE RATES PER AUM FOR PRIVATE AND STATE TRUST LANDS: 1970-2010

4.2 Analysis of Trends in DNRC Grazing Lease Rates for Competitively Bid Leases

The 1993 grazing report discussed the small share of state trust grazing lands that are competitively bid in the leasing process. In 2011, DNRC reported that of an estimated 975,766 AUMs of trust land grazing leased, only about 5% of leases, constituting 46,339 AUMs were issued above the base lease rate. Duffield and Anderson in their 1992 statewide grazing survey and analysis found no significant differences in terms of land type and services provided between those state leases that received multiple bids and those that were issued to a single applicant.

Before examining potential reasons for the low numbers of competitive bids on state leases, it is of interest to look at the characteristics of the currently held competitively bid state leases. These leases

are issued for up to 10 year terms. Because there are a substantial number of competitively bid leases (402 leases currently), and because a portion of these leases are bid each year, the pool of currently held competitively bid state leases can be examined as a set of 10 samples of leases bid and issued in the years 2002 through 2011. Table 8 shows summary information on currently held competitively bid Montana trust land grazing leases. The average lease price for the entire 10 year period is $14.28 per AUM.

TABLE 8. MONTANA TRUST LAND COMPETITIVELY BID LEASES, BY YEAR OF LEASE SIGNING (AS OF MARCH 2011)

Year	Number of Leases	Total AUMs	Average of $/AUM
2002	38	3,552	$ 10.54
2003	51	4,584	$ 12.62
2004	38	4,365	$ 10.47
2005	52	4,119	$ 14.17
2006	38	2,973	$ 14.95
2007	41	7,520	$ 14.29
2008	39	6,597	$ 16.53
2009	30	2,632	$ 13.53
2010	46	6,325	$ 16.69
2011	29	3,672	$ 16.39
Total	**402**	**46,339**	**$ 14.28**

In addition to deriving an average lease rate from the competitively bid lease data, it is possible to estimate the annual trend in winning prices paid for the competitively bid leases over the 10 year period. Figure 6 shows a comparison of average lease prices for competitively bid trust land grazing leases and for private grazing leases in Montana. Also shown in the figure are the estimated linear trendlines for the two series.

Annual inflation accounts for about 64 percent of the year to year variation in the average competitively bid lease rate per AUM. Over the 10 year period, average winning lease bids increased an average of 66 cents per AUM year over year. Clearly, as with the NASS private Montana grazing lease rates, the DNRC competitive bids have also seen a consistent upward trend in recent years.

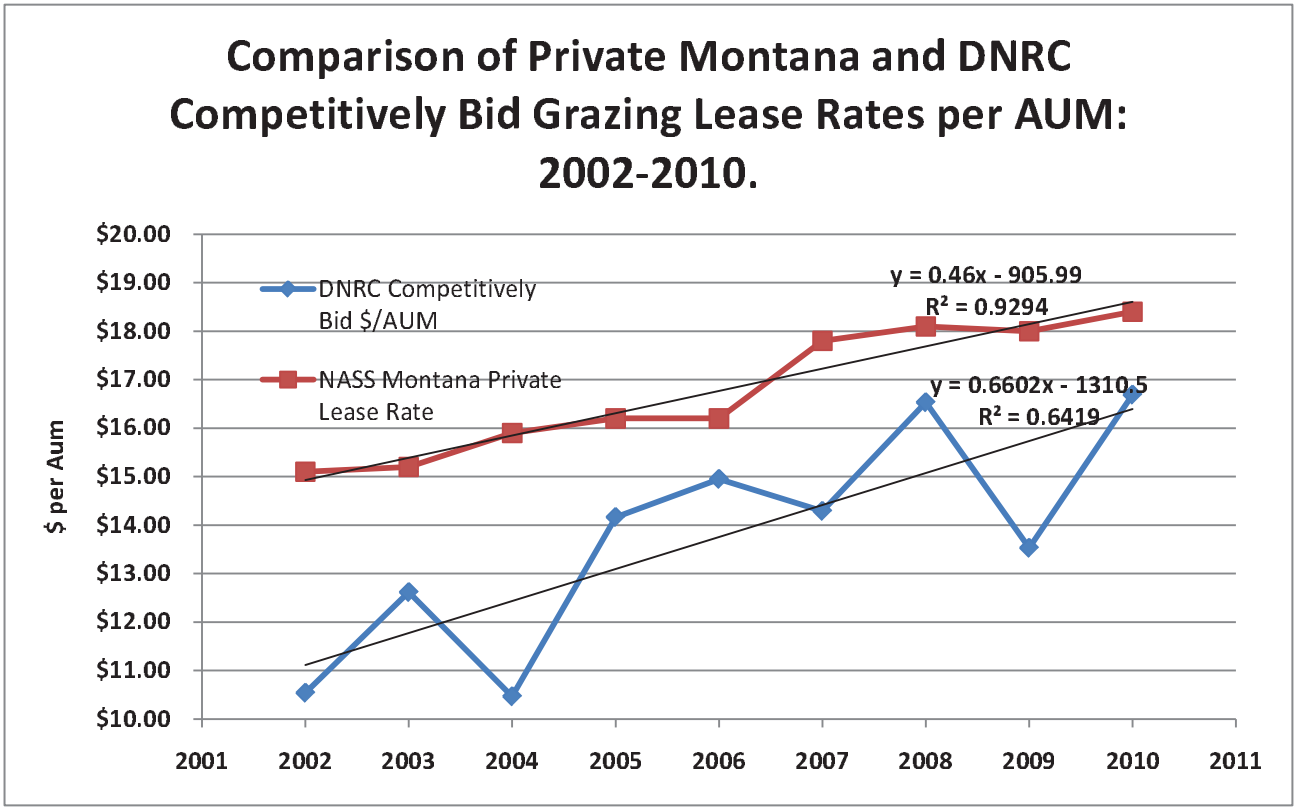

FIGURE 6. CONPARISON OF PRIVATE MONTANA AND DNRC COMPETITIVELY BID GRAZING LEASE RATES PER AUM: 2002-2010

4.3 Comparison of Montana and Benchmark Grazing Lease Fee Levels: 1992 and 2010

Sections 3 and 4 of this report have discussed previously compiled and current data on public and private land grazing fees for the state of Montana. Table 9 summarizes this information and presents it from two comparative perspectives. First, the grazing fee data are presented as a comparison between the DNRC base grazing lease rate per AUM and the six alternative benchmark grazing rates in the state. Additionally, a comparison is made between lease rates for the DNRC base and alternative benchmark rates for 1992 and the most recent years (2010-11). These comparisons are discussed in turn for each of the benchmark rates and for the DNRC base rate. Not all of the benchmark grazing rates shown in Table 9 are necessarily strictly comparable to the appropriate lease rates for state trust lands. Different leases are characterized by different levels of landowner services, different durations of the lease, and different land characteristics. The six benchmark estimates are presented to demonstrate the general range of Montana grazing lease rates.

4.3.1 DNRC Montana Base Trust land Grazing Rate

Row (A) of Table 9 shows the DNRC base lease rate per AUM for 1992 and for 2010. Also shown for this rate (and for the following benchmark rates) are the percent change in this rate from 1992 to 2010, what percent of the NASS Montana private lease rate this state rate was in 1992, and what percent of the private rate it is currently.

From 1992 to 2010 the DNRC base rate for grazing increases from $4.17 to $6.23 per AUM. This represents a 49% increase over the period. Between 1992 and 2010 the DNRC base rate decreased as a percent of the NASS-published average private grazing fee for Montana. In 1992 the DNRC base rate was 37% of the private rate, and in 2010 it was 34% of the private rate.

4.3.2 1993 Hedonic Model Predicted Rate for "typical" State Trust Land Leases

The 1993 Montana grazing fee study utilized collected statewide grazing lease data to estimate a hedonic model of grazing rates in the state. This model was then used to predict the fair market rate for a state trust land lease that had the characteristic of the "typical" state lease (no landowner provided services, and a lease term of > 5 years). The 1992 predicted fair market rate for a state lease reported by (Duffield and Anderson 1993) was $7.69 per AUM. This rate was 68% of the 1992 NASS private land lease rate for Montana. Using this relationship and current NASS private rates for Montana, leads to an estimated predicted fair market rate for state leases in 2010 of $12.56 per AUM.[13]

Because the updated predicted state rate is based off of changes in the NASS private rate, the change in the predicted hedonic rate from 1992 to 2010 is the same as the actual change in the private rate, a 63% increase. The predicted state rate based on the hedonic model is 68% of the private rate for both 1992 and 2010.

4.3.3 DNRC Competitively Bid Lease Rates

The average price of the sub-population of state trust land leases that received competitive bids when awarded has grown substantially from 1992 to 2011. In 1992 the average rate for competitively bid leases was $8.34 per AUM. As of March 2011 this average rate was $14.28 per AUM. The average rate of the winning bids for competitive state leases increased 71% from 1992 to 2011. In 1992 the average competitive bid rate was 74% of the NASS private lease rate, and in 2010, this had increased to 78% of the private lease rate per AUM.

4.3.4 National Agricultural Statistics Service Montana Private Grazing Rates

NASS-reported private lease grazing fees for Montana increased 63% from 1992 to 2010, from $11.27 to $18.40 per AUM.

[13] This estimate is based on the assumptions that the underlying relationship between the true value of state and private leases has not change significantly over this period. Conversations with DNRC personnel indicate that the structure of state leases has remained generally unchanged in respect to the key factors incorporated in the hedonic model over the relevant years.

4.3.5 Department of the Interior Montana National Wildlife Refuge Rates

The 1993 Montana grazing report did not include information on grazing rates for national wildlife refuges within the state. This information is now available, and provides a new benchmark for comparison to state lease rates. As previously noted, the DOI-administered rates for Montana national wildlife refuges are based on the NASS private grazing rate (currently $18.40/AUM).[14] These leases differ from state leases in that they are one-year leases, and there is landowner participation in land management and improvements.

4.3.6 Bureau of Indian Affairs Montana reservation Land grazing Rates

The 1993 grazing report found an average lease rate for BIA-administered grazing lease in Montana of $8.37/AUM. The current average lease rate across the five reservations administered by the BIA Rocky Mountain Region is $18.65/AUM. This represents a 123% increase in estimated BIA lease rates per AUM from 1992 to 2010. In 1992 it was estimated that BIA rates were 74% of NASS private rates. In 2010 it is estimated that grazing rates on BIA-administered lands are on average 101% of private rates.

As noted, BIA-administered grazing leases are similar in structure and services to state of Montana trust land leases.

4.3.7 Literature Review-Based Estimate of Fair Value Trust Land Leases

A final perspective on a fair market rate was provided by Duffield and Anderson (1993) based on their review of the economics literature. New Mexico researchers (Torell, Ghosh and Fowler 1988) found that about 30% of the amount paid for private market grazing leases was for services (such as fencing, water, weed control) This suggests that (applying the New Mexico results to Montana) the fair market rate for state trust lands can be approximated as 70% of the NASS average private market rate. In 1992, 70% of the NASS private rate was $8.30 per AUM. In 2010, this value was $12.88 per AUM.

4.3.8 BLM and USFS (1978 PIRA) Rates

A final point of comparison is the federal grazing rate for 16 western states set annually by the BOM and USFS. This rate (set by formula) was $1.92/AUM in 1992 and is $1.35/AUM in 2011. The federal rate has been a source of considerable controversy, and today stands in stark contrast to other Montana rates such as the BIA and DOI (national wildlife refuge) rates.

[14] The Montana DFWP also uses the NASS private grazing rater as an initial basis for setting grazing fees on state Wildlife Management Area lands. For new WMA leases, FWO charges the NASS rate unless either 1) the lessee is required to perform significant fence installation or maintenance (in which case the DNRC rate is charged, or 2) the lease is a component of a larger "exchange of use" agreement with the lessee (Per. Comm. Steve Knapp, Wildlife Habitat Section Supervisor, DFWP. April 14, 2011).

TABLE 9. COMPARISON OF MONTANA GRAZING LEASE RATES PER AUM: 1992 AND 2010-11

Estimate/rate	1992	2010-11	% Change 1992-2010	% of Private 1992 Rate	% of Private 2010 Rate
(A) DNRC Base Rate	**$ 4.17**	**$ 6.23**	**149%**	**37%**	**34%**
(B) Private Rate (NASS)	**$ 11.27**	**$ 18.40**	**163%**	**--**	**--**
(C) Montana (DNRC) Specific Estimates					
(1) Hedonic model (typical state lease) Rate	**$ 7.69**	**$ 12.56**	**163%**	**68%**	**68%**
(2) DNRC Competitive Bids	**$ 8.34**	**$ 14.28**	**171%**	**74%**	**78%**
(3) Economics Literature Torell et al. (1988)	**$ 8.30**	**$ 12.88**	**155%**	**74%**	**70%**
(D) Federal Rates					
(1) CMR (DOI)	--	$ 18.40			100%
(2) BIA	$ 8.37	$ 18.65	223%	74%	101%
(3) BLM & USFS (1978 PIRA)	$ 1.92	$ 1.35	-30%	17%	7%

5.0 CONCLUSIONS AND RECOMMENDATIONS ON GRAZING LEASE VALUATION METHODS AND LEVELS

The 1993 Montana grazing study (Duffield and Anderson 1993) presented as its overall conclusion regarding the appropriate state trust lease rates the following:

> "As a result of an intensive (and extensive) survey of Montana ranchers concerning grazing lease rates and four additional methods of analysis, we conclude that current state lease rates are much lower than current fair market value. Lease rates on Montana DSL grazing leases currently average $4.24 per AUM. The preceding analysis suggests that fair market value for these leases is on the order of $7.50 to $8.50 per AUM." (Duffield and Anderson 1993, ES-7)

The 1993 analysis estimated that an appropriate level for state land lease rates in that year was between 66% and 75% of private lease rates.

The analysis presented in this report updates and expands on the 1993 study and results. Table 9 shows four alternative classes of Montana grazing lease fees. Class (A) is the DNRC base rate, Class (B) is the NASS private lease rate, Class (C) includes rates based on DNRC-specific data or estimates, and Class (D) includes federally set rates. Of these groups, the estimates in Class (C) provide the most appropriate guidance in determining fair market levels for Montana trust land leases.

This updated analysis suggests fair market rates for DNRC trust land grazing leases (expressed as a percentage of the NASS-published average annual Montana private grazing lease rate), should be on the order of 70% to 80% of private grazing rates. The recommendation of this report would be to increase Montana trust land grazing leases to 70% of annual NASS private rates initially in order to give time for lessees to transition to the new higher leases. The best measure of whether this lease rate level continues to be less than the prevailing fair market rate for comparable leases will be the extent to which trust land leases go vacant at the 70% of private level. If few leases go unsold at the 70% level, DNRC could look toward raising the DNRC/Private ratio to 75% -80% in the future.

6.0 DISCUSSION OF LIMITATIONS OF ANALYSIS AND ADDITIONAL CONSIDERATIONS

The 1993 Montana grazing study was a comprehensive analysis of grazing lease valuation in Montana, including statewide original data collection and analysis and participation and peer review by a wide spectrum of industry, agency and academic experts on grazing issues, survey design and statistical analysis. This report uses the 1993 study as a base reference point upon which to update and expand the analysis consistent with the structure of the original report. The results presented in section 5, above, suggests that in the intervening 18 years between the completion of the 1993 study and this report State of Montana trust land grazing lease rates have consistently lagged behind what other evidence suggests should be the fair market value of these rates.

This updated analysis is limited in several ways. However, this analysis also provides additional estimates of Montana grazing rates that strengthen the 1993 conclusions.

The updated predicted fair market value of a "typical" Montana trust land grazing lease from the 1993 hedonic model is constrained in that the estimate is not based on 2010 data, but rather on data collected in 1992 and applied to 2010 average private lease rates for the state. To the extent that the general characteristics of different classes of leases in the state may have changed significantly between 1992 and 2010, the accuracy and applicability of this estimate may be limited.

The authors of the 1993 report found that competitively bid state trust leases did not differ from those not receiving multiple bids with regard to land type and services provided. The 2011 average lease price for these competitively bid leases of $15.04 per AUM is presented as a benchmark comparison point on the assumption that these leases are currently not significantly different from other DNRC leases with regard to characteristics generally found to impact lease value.

The current updated analysis strengthens the 1993 findings with the inclusion of lease rates charged by DOI for leases on Montana national wildlife refuge lands. These rates (currently set at the state NASS private lease rate) provide an additional perspective and benchmark for comparison that was not available in the 1993 study.

6.1 Competitively Bid vs. Non-Competitive DNRC Leases

As discussed previously, about 5% of DNRC grazing leases currently not issued at the minimum rate during the lease bidding process. Also, as noted, the average lease price for the sub-group of competitively bid state leases is nearly 2.5 times the base price for the remaining 95% of state leases. On the surface, there appears to be a logical contradiction between the primary conclusion of this study (and the 1993 study before it) and market evidence from the leasing process. Our analysis

suggests that Montana state trust lands have a base price that is set significantly below a fair market price for the resource. However, within a market auction setting the vast majority of these lands are not valued above this low base price.

The 1993 grazing report survey asked several questions that explain these seemingly contradictory conclusions. Duffield and Anderson found in their survey data that 29% of state land leases were unfenced parcels and inholdings wholly surrounded by land owned or controlled by the lessee. This 29% of state leases is therefore not suitable for competitive bidding.

The 1993 grazing survey also asked ranchers a question on their willingness to bid against neighbors for state land leases. The question asked was,

> "Suppose that there was a state lands grazing lease in your area that could work well in your livestock operation, but the lease is currently held by a neighbor. At the time of lease renewal, would you submit a competitive bid"?

Over 55% of ranchers responded that they would NOT submit a competing bid against a neighbor. Only 21.8% said they definitely would under the hypothetical situation presented.

The combination of the 5% of DNRC leases that are currently competitively bid, the estimated 29% that are unfenced inholdings unsuitable for competitive bid, and the strong reluctance expressed by over 55% of surveyed ranchers to submit a competing bid against a neighbor, even if a state parcel fit in well with their operation, suggests that a significant share of state grazing leases cannot be competitively bid. This underscores the need to provide another approach for setting fair market lease prices, which is the point of the current analysis.

BIBLIOGRAPHY

Ashenfelter, O. and C. Rouse, 1998. "Income, Schooling, And Ability: Evidence From A New Sample Of Identical Twins," *The Quarterly Journal of Economics*, MIT Press, vol. 113(1), pages 253-284, February.

Bartlett, E.T., J.R. McKean and W. Winger. *Grazing Lease Fee Arrangements of Western Governments and Agencies for Study of Western State, Local Governments, and Other Federal Agencies Grazing Leasing Arrangements and User Charges.* USDA Forest Service, COlorado State University, 1983.

Borman, M.E. and D.E. Johnson. "Evolution of Grazing and Land Tenure Policies on Public Lands." *Rangelands*, 1990: 203-206.

Duffield, J., and B Anderson. *Economic Analysis of the Values of Surface Uses of Stste Lands.* Helena: Montana Department of State Lands, 1993.

General Accounting Office. 2005. Livestock Grazing: Federal Expenditures and Receipts Vary, Depending on the Agency and the Purpose of the Fee Charged. Report to Congressional Requesters. Spetember 2005. GAO-05-869: 109 pp.

Rosen, J. "Hedonic Prices and Implicit Markets: Product Differentiation in Pure Competition." *Journal of Political Economy*, 1974: 34-55.

Rouse, L.R. *Final Report, Rangeland Survey for the State Land Board (Colorado).* Colorado State Land Board, 1991.

Souder, J. "Economic Strategies for the Management of School and Institutional Trust Lands: A Comparative Study of Ten Western States." *Ph.D. Dissertation, University of California at Berkeley.* Berkeley, 1990.

Souder, J., and S. Fairfax. "The State School Trust Lands." *Annual Meeting of the Western Political Science Association.* Newpoer Beach, CA, 1990.

Souder, J., and S. Fairfax. *Western States Trust and Sovereign Lands Survey Results.* Project #4548-H, Berkeley: Agricultural Experiment Station, University of California at Berkeley, 1991.

Torell, L. A., and J.P. Doll. "Public Land Policy and the Value of Grazing Permits." *Western Journal of Agricultural Economics*, 1991: 174-184.

Torell, L., Rimbey, N., Van Tassell, L., Tanaka, J., Bartlett, T. "An Evaluation of the Federal Grazing Fee Formula." *Journal of Range Management*, 2003: 577-584.

Torell, L.A., S. Ghosh, and J.M. Fowler. *Economic Considerations for Setting Grazing Fees on New Mexico State Trust Lands.* Special Report 81, New Mexico State University Agricultural Experiment Station, 1988.

U.S. Department of Agriculture and the Department of Interior. "Grazing Fee Review and Evaluation, Update of the 1986 Final Report." 1992.

USDA National Agricultural Statistics Service. *Private Grazing Fee Rates: Average Rates by Method of Payment, Montana, USA.* 2011. http://www.nass.usda.gov/Statistics_by_State/Montana/Publications/economic/prices/grazefee.htm (accessed February 16, 2011).

Workman, J.P. "Federal grazing Fees: a Controversy that Won't Go Away." *Rangelands*, 1988: 128-131.

APPENDIX A: HISTORICAL STATE OF MONTANA TRUST LAND GRAZING LEASE BASE RATES

Montana State Lands AUM Grazing Rates

YEAR	RATE	YEAR	RATE		
1952	$0.40	1981	$3.85		
1953	$0.43	1982	$3.47		
1954	$0.42	1983	$2.97		
1955	$0.35	1984	$3.00		
1956	$0.28	1985	$2.74		
1957	$0.25	1986	$2.81		
1958	$0.25	1987	$2.77		
1959	$0.28	1988	$3.27		
1960	$0.54	1989	$3.89		
1961	$0.48	1990	$3.92		
1962	$0.48	1991	$4.24		
1963	$0.46	1992	$4.17		
1964	$0.76	1993	$4.03		
1965	$0.70	1994	$4.09		
1966	$0.68	1995	$4.61	$5.15	
1967	$0.74	1996	$4.05	$4.53	
1968	$0.76	1997	$3.22	$3.60	
1969	$0.76	1998	$3.58	$4.01	
1970	$0.80	1999	$3.93	$4.40	
1971	$0.75	2000	$3.73	$4.17	
1972	$0.87	2001	$4.42	$4.94	$5.55
1973	$0.95	2002	$4.93	$5.52	$6.20
1974	$1.69	2003	-	$5.13	$5.77
1975	$1.79	2004	-	$4.88	$5.48
1976	$1.30	2005	-	$5.91	$6.64
1977	$1.48	2006	-	$6.22	$6.99
1978	$1.45	2007	-	$7.01	$7.87
1979	$1.68	2008	-	$6.18	$6.94
1980	$3.64	2009	-	$6.20	$6.97
		2010	-	$5.44	$6.12
		2011	-	-	$6.23

RENTAL CALCULATION

1952 - 1963 RATE = AVERAGE PRICE PER POUND FOR BEEF IN MONTANA FROM THE PREVIOUS YEAR. Average rate for period: $0.39.

1964 - 1973 RATE = 2 X AVERAGE PRICE PER POUND FOR BEEF IN MONTANA FROM THE PREVIOUS YEAR + .32¢. Average rate for period: $0.78.

NOTE: Rental rates for 1964 through 1991 are "B" rates (15 - 19 AU per section). Add $0.10 for "A" rate (>19 AU per section), or subtract $0.10 for "C" rate (<15 AU per section). Beginning in 1992, the adjustments based on AU/section were discontinued.

1974 - 1979 RATE = 3 X AVERAGE PRICE PER POUND FOR BEEF IN MONTANA FROM THE PREVIOUS YEAR + 50¢. Average rate for period: $1.57.

1980 - 1995 RATE = 6 X AVERAGE PRICE PER POUND FOR BEEF IN MONTANA FROM THE PREVIOUS YEAR. Average rate for period: $3.59.

1995 - 2001 RATE = 6.71 X AVERAGE PRICE PER POUND FOR BEEF IN MONTANA FROM THE PREVIOUS YEAR. On May 22, 1995, the Board of Land Commissioners adopted a new multiplier of 6.71. The rate became effective on June 16, 1995, for all leases renewed or issued after July 1, 1993. For those leases renewed or issued before July 1, 1993, the rate using the 6 multiplier will be charged until the renewal of the lease. The first rate listed is the 6 multiplier, the second is the 6.71 multiplier.

2001 - RATE = 7.54 X AVERAGE PRICE PER POUND FOR BEEF IN MONTANA FROM THE PREVIOUS YEAR. On September 17, 2001, the Board of Land Commissioners adopted a new multiplier of 7.54. The rate is effective for all leases renewed or issued after June 30, 2001. For leases issued or renewed between July 1, 1993 and June 30, 2001, the rate using the 6.71 multiplier will be charged until the next renewal of the lease. For those leases renewed or issued before July 1, 1993, the rate using the 6 multiplier will be charged until the next renewal of the lease. The first rate listed is the 6 multiplier, the second is the 6.71 multiplier, and the last is the 7.54 multiplier.

APPENDIX B: MARCH 2011 COMPETITIVELY BID DNRC GRAZING LEASES

Lease #	County	$/AUM	Terms Efftective Date	AUMs	Acres
3952	Beaverhead	$7.32	3/1/2003	78	396.7
10116	Beaverhead	$30.12	3/1/2010	861	3385.18
10543	Big Horn	$42.85	8/12/2004	21	68.9
5016	Big Horn	$12.00	3/1/2006	42	141.43
2537	Big Horn	$20.01	3/1/2008	36	160
10681	Big Horn	$9.00	5/5/2010	25	131.4
1117	Big Horn	$46.23	3/1/2011	63	315
10492	Blaine	$6.26	7/24/2002	97	320
2547	Blaine	$6.23	3/1/2003	72	404.9
10574	Blaine	$22.23	9/9/2005	9	38.18
2568	Blaine	$15.00	3/1/2007	177	627.8
2897	Blaine	$21.53	3/1/2008	116	640
5449	Blaine	$23.40	3/1/2009	171	636
9343	Blaine	$14.50	3/1/2009	312	597.82
8068	Blaine	$13.68	3/1/2010	201	638
6739	Broadwater	$12.00	3/1/2005	36	160
2456	Broadwater	$9.00	3/1/2007	119	622
9980	Carbon	$7.11	3/1/2002	121	620
2582	Carbon	$8.77	3/1/2003	177	524.1
3963	Carbon	$9.77	3/1/2003	115	358
10562	Carbon	$15.00	3/1/2005	130	620
10570	Carbon	$6.80	9/6/2005	39	355
5507	Carbon	$23.05	3/1/2008	137	614.54
6669	Carbon	$15.00	3/1/2009	79	452
339	Carbon	$23.05	3/1/2011	138	642.08
4715	Carter	$16.00	3/1/2005	134	640
7112	Carter	$16.00	3/1/2005	142	640
10568	Carter	$11.00	9/2/2005	40	160
1529	Carter	$25.00	3/1/2007	165	620
7385	Carter	$10.84	3/1/2010	106	817.6
2303	Cascade	$10.50	3/1/2002	120	584.5
10487	Cascade	$21.04	6/20/2002	120	907.8
10488	Cascade	$22.18	6/25/2002	55	157.9
3968	Cascade	$10.00	3/1/2003	116	441.3
10505	Cascade	$30.00	3/1/2003	5	10
10513	Cascade	$10.50	5/18/2003	20	167
10537	Cascade	$6.23	7/27/2004	15	80
4717	Cascade	$7.50	3/1/2005	53	48.9
7534	Cascade	$6.64	3/1/2005	0	0

Lease #	County	$/AUM	Terms Efftective Date	AUMs	Acres
9509	Cascade	$10.64	3/1/2005	97	352
8079	Cascade	$9.98	3/1/2006	59	244
10569	Cascade	$6.85	1/4/2006	19	70
244	Cascade	$20.87	3/1/2007	14	49.4
10614	Cascade	$8.00	6/11/2007	105	290.1
10623	Cascade	$12.00	3/1/2008	34	117
10654	Cascade	$31.87	4/22/2009	64	76.7
10666	Cascade	$36.97	7/30/2009	49	279.4
8081	Cascade	$16.12	3/1/2010	34	141
10684	Cascade	$22.00	5/11/2010	23	98.3
1122	Cascade	$12.68	3/1/2011	102	248.6
1128	Cascade	$22.13	3/1/2011	141	640
1292	Cascade	$23.63	3/1/2011	127	640
9064	Cascade	$17.65	3/1/2011	102	468
1493	Chouteau	$7.50	3/1/2002	122	557
1496	Chouteau	$11.00	3/1/2002	149	640
2668	Chouteau	$6.50	3/1/2002	18	72.9
9968	Chouteau	$14.00	3/1/2002	44	156
9238	Chouteau	$21.00	3/1/2003	14	40
9239	Chouteau	$21.00	3/1/2003	14	40
10510	Chouteau	$25.25	6/5/2003	23	74
10512	Chouteau	$7.00	6/23/2003	134	326
4326	Chouteau	$10.25	3/1/2004	142	640
4492	Chouteau	$7.15	3/1/2004	164	809.27
5009	Chouteau	$7.15	3/1/2004	7	34.4
10531	Chouteau	$7.00	5/4/2004	9	79.4
359	Chouteau	$12.50	3/1/2006	51	235.1
3799	Chouteau	$18.50	3/1/2008	430	1704.79
9298	Chouteau	$10.00	3/1/2008	31	159.5
10100	Chouteau	$8.00	3/1/2008	76	412.89
8081	Chouteau	$16.12	3/1/2010	60	327.1
8089	Chouteau	$6.37	3/1/2010	94	307.96
8181	Chouteau	$7.00	3/1/2010	142	630
10132	Chouteau	$20.00	3/1/2010	133	524
9233	Custer	$9.02	3/1/2003	131	636
10044	Custer	$23.75	3/1/2003	120	635
10051	Custer	$6.50	3/1/2003	92	560
4340	Custer	$13.30	3/1/2004	27	108.1
7405	Custer	$10.00	3/1/2005	158	635

Lease #	County	$/AUM	Terms Efftective Date	AUMs	Acres
7406	Custer	$8.00	3/1/2005	40	160
7669	Custer	$10.25	3/1/2005	129	615
1550	Custer	$15.00	3/1/2007	36	222.42
4086	Custer	$18.00	3/1/2007	50	55.7
10606	Custer	$15.00	3/31/2007	430	1904
10607	Custer	$15.00	3/1/2007	450	1903.19
10608	Custer	$15.00	3/1/2007	472	2513.33
2942	Custer	$17.00	3/1/2008	57	160
10605	Custer	$15.00	3/1/2008	2480	12510.34
10667	Custer	$26.25	3/1/2010	153	640
10672	Custer	$25.12	3/1/2010	149	640
10578	Daniels	$12.00	1/5/2006	9	40
2972	Daniels	$15.00	3/1/2007	150	640
5334	Daniels	$15.00	3/1/2007	101	320
10615	Daniels	$9.50	7/3/2007	105	263.4
4738	Dawson	$10.00	3/1/2005	144	589.3
10120	Dawson	$50.00	3/1/2005	5	16
10567	Dawson	$20.00	10/5/2005	28	66.6
7064	Dawson	$10.00	3/1/2006	15	50
2469	Dawson	$7.87	3/1/2007	108	384.7
10665	Dawson	$7.00	7/7/2009	40	570
10638	Deer Lodge	$6.94	5/8/2008	75	255.5
3098	Fallon	$16.00	3/1/2003	124	474.77
3981	Fallon	$14.27	3/1/2003	62	240
4364	Fallon	$12.98	3/1/2004	34	104
10548	Fallon	$6.23	9/27/2004	182	640
6457	Fallon	$13.50	3/1/2009	86	320
198	Fallon	$10.50	3/1/2011	85	240
1641	Fergus	$8.00	3/1/2002	125	639.66
4279	Fergus	$20.00	3/1/2003	224	640
4382	Fergus	$8.00	3/1/2004	315	1479.3
4501	Fergus	$10.15	3/1/2004	97	312
4656	Fergus	$8.00	3/1/2004	567	2658.72
5674	Fergus	$10.15	3/1/2004	108	628.1
6055	Fergus	$8.00	3/1/2004	108	400
4958	Fergus	$18.00	3/1/2005	462	1209.22
5778	Fergus	$10.64	3/1/2005	44	160
7428	Fergus	$11.40	3/1/2005	133	585.2
8370	Fergus	$14.72	3/1/2005	149	630

Lease #	County	$/AUM	Terms Efftective Date	AUMs	Acres
10144	Fergus	$6.65	3/1/2005	31	223.5
10564	Fergus	$26.00	5/10/2005	102	229
610	Fergus	$16.99	3/1/2006	44	255.6
7585	Fergus	$10.00	3/1/2006	118	640
268	Fergus	$10.88	3/1/2007	68	232.5
10251	Fergus	$23.00	3/1/2007	82	310
10604	Fergus	$20.00	3/1/2007	300	775.21
10669	Fergus	$18.21	3/1/2008	82	304.05
9498	Fergus	$24.00	3/1/2009	77	640
8273	Fergus	$17.00	3/1/2010	55	159
8816	Fergus	$18.00	3/1/2010	156	640
10451	Fergus	$10.00	3/1/2011	48	360
3053082	Flathead	$6.23	6/28/2002	145	484
3053085	Flathead	$13.00	8/22/2003	60	531.4
3053086	Flathead	$13.00	3/1/2006	7	38
3053469	Flathead	$6.23	5/11/2010	64	640
10688	Flathead	$12.02	3/1/2011	289	1268.85
9183	Gallatin	$10.65	3/1/2002	54	216
3818	Gallatin	$12.00	3/1/2003	77	76.14
4068	Gallatin	$6.23	3/1/2003	6	22.3
10067	Gallatin	$7.48	3/1/2004	46	119.33
4859	Gallatin	$9.37	3/1/2005	8	27.21
6300	Gallatin	$31.51	3/1/2005	21	66.4
9475	Gallatin	$30.00	3/1/2005	19	82
5095	Gallatin	$6.99	3/1/2006	97	627
3935	Gallatin	$9.00	3/1/2007	124	470.2
8640	Gallatin	$22.00	3/1/2008	172	496
10291	Gallatin	$6.94	3/1/2008	94	450
10626	Gallatin	$16.05	3/1/2008	227	640
10639	Gallatin	$26.94	6/2/2008	35	47.66
10659	Gallatin	$42.86	5/27/2009	35	146
7130	Gallatin	$7.12	3/1/2010	84	313
10015	Garfield	$12.50	3/1/2003	92	680
10101	Garfield	$7.08	3/1/2004	113	640
10539	Garfield	$8.00	8/12/2004	108	640
10541	Garfield	$6.23	8/13/2004	84	320
460	Garfield	$15.24	3/1/2006	144	640
10159	Garfield	$28.37	3/1/2006	141	619
3860	Garfield	$10.00	3/1/2008	168	780

Lease #	County	$/AUM	Terms Efftective Date	AUMs	Acres
4051	Glacier	$11.77	3/1/2003	16	76
9240	Glacier	$11.77	3/1/2003	153	625
5059	Golden Valley	$20.00	3/1/2006	60	320
9932	Golden Valley	$10.25	3/1/2011	125	513.24
3063261	Granite	$12.25	7/1/2002	49	360
4018	Granite	$20.00	3/1/2003	122	480
10575	Granite	$10.26	1/5/2006	13	31.5
1769	Hill	$8.45	3/1/2002	67	147
10517	Hill	$31.25	7/21/2003	16	115
8154	Hill	$12.00	3/1/2005	174	630
10220	Hill	$21.00	3/1/2005	58	477
10594	Hill	$6.99	10/12/2006	40	138.8
1777	Hill	$9.00	3/1/2007	77	318.2
3121	Hill	$14.00	3/1/2008	167	640
7799	Hill	$12.50	3/1/2010	148	474
10685	Hill	$15.12	5/11/2010	79	319
493	Hill	$20.00	3/1/2011	212	640
1792	Jefferson	$31.50	3/1/2002	27	186.9
3997	Jefferson	$22.10	3/1/2003	172	640
10657	Jefferson	$8.07	7/30/2009	73	640
7610	Jefferson	$8.33	3/1/2010	144	640
7611	Jefferson	$50.00	3/1/2010	39	182.6
1800	Judith Basin	$7.50	3/1/2002	65	120.17
1821	Judith Basin	$18.17	3/1/2002	124	319
4424	Judith Basin	$10.80	3/1/2004	190	545.48
5802	Judith Basin	$10.50	3/1/2004	200	590.2
9904	Judith Basin	$10.52	3/21/2005	127	640
10559	Judith Basin	$22.00	3/1/2005	59	233.9
7137	Judith Basin	$15.00	3/1/2006	145	300.96
1795	Judith Basin	$12.00	3/1/2007	17	62.1
8636	Judith Basin	$19.98	3/1/2008	293	839
394	Judith Basin	$18.23	3/1/2011	10	52.18
10676	Lake	$7.12	3/21/2010	50	480
10688	Lake	$12.02	3/1/2011	248	1388.6
1829	Lewis and Clark	$9.25	3/1/2002	16	115
10493	Lewis and Clark	$7.20	7/24/2002	155	640
10509	Lewis and Clark	$6.23	6/5/2003	101	549.36
7202	Lewis and Clark	$15.00	3/1/2006	148	318
1841	Lewis and Clark	$16.00	3/1/2007	57	200

Lease #	County	$/AUM	Terms Efftective Date	AUMs	Acres
2006	Lewis and Clark	$9.00	3/1/2007	1097	3370.35
5409	Lewis and Clark	$16.00	3/1/2007	677	2305
5410	Lewis and Clark	$16.00	3/1/2007	275	720
10238	Lewis and Clark	$150.00	3/1/2007	17	160
3033391	Lewis and Clark	$8.25	3/1/2007	142	1041
3839	Lewis and Clark	$41.67	3/1/2008	13	148
3073076	Lewis and Clark	$7.00	8/11/2008	33	2120
6504	Lewis and Clark	$7.20	3/1/2009	125	463
3073077	Lewis and Clark	$8.00	4/28/2009	12	160
7203	Lewis and Clark	$22.00	3/1/2010	199	640
7969	Lewis and Clark	$12.12	3/1/2010	251	612
3267	Liberty	$15.77	3/1/2003	26	122
6144	Liberty	$16.00	3/1/2004	266	640
5750	Liberty	$20.00	3/1/2009	90	366.54
3053468	Lincoln	$7.00	8/5/2009	48	27
613	Lincoln	$21.23	3/1/2011	104	575
1869	Madison	$6.87	3/1/2002	102	316
10495	Madison	$35.00	7/25/2002	11	40
4772	Madison	$9.00	3/1/2005	46	160
10560	Madison	$8.64	3/1/2005	88	262
299	Madison	$15.00	3/1/2006	250	640
5213	Madison	$12.00	3/1/2006	27	78.1
9553	Madison	$12.00	3/1/2006	41	120
1863	Madison	$15.37	3/1/2007	42	280
5373	Madison	$15.00	3/1/2007	85	321.27
5836	Madison	$16.25	3/1/2009	16	80
7514	Madison	$46.12	3/1/2010	2	27.3
3073079	Madison	$6.23	8/2/2010	22	88
9208	McCone	$9.00	3/1/2002	65	117.76
9992	McCone	$9.00	3/1/2002	188	640
10491	McCone	$15.15	7/22/2002	66	166.17
10514	McCone	$8.00	7/11/2003	53	61.5
3411	McCone	$24.02	3/1/2008	264	994.4
3415	McCone	$25.48	3/1/2008	157	640
10625	McCone	$22.02	3/1/2008	80	265.6
10668	McCone	$7.50	10/1/2009	120	320
9199	McCone	$10.12	3/1/2010	20	78.8
5105	Meagher	$20.25	3/1/2006	49	151
5433	Meagher	$28.13	3/1/2006	96	478

Lease #	County	$/AUM	Terms Efftective Date	AUMs	Acres
9570	Meagher	$28.41	3/1/2006	44	160
10556	Meagher	$13.16	3/1/2006	19	68.1
3061053	Missoula	$12.74	3/1/2004	54	180
3854	Missoula	$41.10	3/1/2008	32	117
4209	Missoula	$8.36	3/1/2008	36	260
3069613	Missoula	$7.05	3/1/2009	377	1762
3062986	Missoula	$13.00	3/1/2010	40	400
3069616	Missoula	$8.75	1/1/2011	61	3455.96
3069617	Missoula	$8.75	1/1/2011	191	4984.72
3069618	Missoula	$8.75	1/1/2011	239	5079.15
3069619	Missoula	$8.75	1/1/2011	213	5231.99
3069620	Missoula	$8.75	1/1/2011	79	5095
3069621	Missoula	$8.75	1/1/2011	81	3851.8
3753	Musselshell	$10.00	3/1/2003	86	428
4674	Musselshell	$13.00	3/1/2004	80	310
6094	Musselshell	$12.23	3/1/2004	42	160
838	Musselshell	$11.00	3/1/2006	131	480
5966	Musselshell	$10.21	3/1/2009	128	640
1994	Park	$24.25	3/1/2002	49	277
7149	Park	$10.00	3/1/2010	294	465
8999	Park	$10.12	3/1/2010	143	636
641	Park	$15.29	3/1/2011	35	137
10516	Petroleum	$6.23	7/21/2003	42	160
4779	Petroleum	$9.96	3/1/2005	92	640
10494	Phillips	$6.50	7/24/2002	66	320
10499	Phillips	$25.00	3/1/2003	123	160.33
10507	Phillips	$18.00	6/5/2003	248	379
9250	Phillips	$28.00	10/26/2004	138	637
10530	Phillips	$6.23	3/1/2004	191	632.72
9669	Phillips	$7.87	3/1/2007	199	1200
3860	Phillips	$10.00	3/1/2008	100	640
8947	Phillips	$12.00	3/1/2008	128	630
10658	Phillips	$7.10	4/28/2009	11	40
8401	Phillips	$6.23	3/1/2010	133	640
8832	Phillips	$6.50	3/1/2010	148	640
10674	Phillips	$6.23	4/7/2010	136	519.95
10683	Phillips	$6.62	5/28/2010	125	257.34
6588	Pondera	$10.00	3/1/2004	67	243.53
10221	Pondera	$7.00	3/1/2006	31	130.5

Lease #	County	$/AUM	Terms Efftective Date	AUMs	Acres
10593	Pondera	$23.00	10/12/2006	87	413.4
3519	Pondera	$17.02	3/1/2008	162	480
3520	Pondera	$25.28	3/1/2008	89	309.43
10264	Pondera	$14.63	3/1/2008	154	636.05
6034	Pondera	$15.00	3/1/2009	44	160
6544	Pondera	$34.00	3/1/2009	81	372.96
7491	Pondera	$22.54	3/1/2010	24	89.6
668	Pondera	$30.50	3/1/2011	89	361.65
1946	Powder River	$7.50	3/1/2002	144	640
1961	Powder River	$8.00	3/1/2002	113	436.2
10533	Powder River	$16.00	6/6/2004	225	1391.26
7493	Powder River	$20.75	3/1/2005	60	240.6
3063261	Powell	$12.25	7/1/2002	49	278.8
3063262	Powell	$6.23	6/12/2003	22	125
3033392	Powell	$8.25	3/1/2007	135	1120
3069612	Powell	$8.63	7/20/2007	110	626
3033393	Powell	$8.50	3/1/2009	20	80
3033394	Powell	$8.50	3/1/2009	33	330
3299	Ravalli	$6.50	3/1/2003	230	638.81
1177	Ravalli	$25.34	3/1/2011	150	640
2342	Richland	$10.13	3/1/2002	113	395.4
4464	Richland	$7.48	3/1/2004	115	560
10540	Richland	$6.23	8/12/2004	2	17.9
9889	Richland	$12.00	3/1/2005	72	180
10558	Richland	$7.00	3/23/2005	10	40
10576	Richland	$17.64	9/9/2005	13	46.87
10622	Richland	$25.01	1/31/2008	100	124.9
8980	Richland	$20.00	3/1/2010	23	99.45
2047	Roosevelt	$12.40	3/1/2002	53	269.81
4036	Roosevelt	$6.23	3/1/2003	16	26.7
10588	Roosevelt	$12.99	3/29/2006	20	40.3
2049	Roosevelt	$20.00	3/1/2007	177	600
3351	Roosevelt	$14.29	3/1/2008	94	376
739	Roosevelt	$20.50	3/1/2011	137	640
1151	Roosevelt	$17.00	3/1/2011	128	632.77
10484	Rosebud	$9.00	3/1/2002	142	562.29
10518	Rosebud	$6.50	8/1/2003	106	470.6
10086	Rosebud	$6.23	3/1/2004	119	635
10542	Rosebud	$7.48	8/13/2004	7	20

Lease #	County	$/AUM	Terms Efftective Date	AUMs	Acres
10545	Rosebud	$6.23	8/25/2004	66	320
10237	Rosebud	$10.26	3/1/2007	156	635
10620	Rosebud	$8.00	11/27/2007	144	640
1155	Rosebud	$6.50	3/1/2011	129	640
9303	Sanders	$8.50	3/1/2002	150	635
3053081	Sanders	$6.23	6/27/2002	36	345
10497	Sanders	$6.23	3/1/2003	23	192.5
3050499	Sanders	$13.00	3/1/2004	80	620
7909	Sanders	$9.00	3/1/2010	34	301
3357	Sheridan	$12.55	3/1/2003	102	320
3358	Sheridan	$13.82	3/1/2003	47	160
8323	Sheridan	$13.28	3/1/2005	26	79
9594	Sheridan	$10.10	3/1/2006	19	81.17
10579	Sheridan	$8.00	1/5/2006	39	104.45
10655	Sheridan	$8.97	4/22/2009	25	160
10403	Sheridan	$12.72	3/1/2010	35	120
7307	Silver Bow	$13.15	3/1/2005	76	640
2098	Silver Bow	$16.10	3/1/2007	13	38
10616	Silver Bow	$41.50	7/6/2007	17	120
8615	Stillwater	$8.00	3/1/2003	55	230
8637	Stillwater	$7.00	3/1/2003	148	640
10511	Stillwater	$8.00	6/5/2003	46	208.5
6959	Stillwater	$8.00	3/1/2004	189	540
9611	Stillwater	$36.00	3/1/2007	137	640
7264	Stillwater	$7.26	3/1/2010	117	427.9
4254	Sweet Grass	$15.63	3/1/2003	79	305
5179	Sweet Grass	$15.00	3/1/2006	227	640
10571	Sweet Grass	$10.08	3/1/2006	199	632.96
10595	Sweet Grass	$10.10	10/12/2006	241	957.66
2120	Sweet Grass	$12.50	3/1/2007	193	545
3625	Sweet Grass	$10.57	3/1/2008	142	635
3873	Sweet Grass	$17.25	3/1/2008	58	530
9701	Sweet Grass	$17.80	3/1/2008	42	159.38
2436	Teton	$12.00	3/1/2002	115	320
10544	Teton	$145.88	8/25/2004	6	38
4901	Teton	$7.50	3/1/2005	142	640
4931	Teton	$7.50	3/1/2005	64	324.8
4976	Teton	$12.00	3/1/2005	39	81.2
10215	Teton	$12.50	3/1/2006	44	130.9

Lease #	County	$/AUM	Terms Efftective Date	AUMs	Acres
3643	Teton	$15.00	3/1/2008	5	18.3
10629	Teton	$7.89	4/8/2008	41	130.1
10631	Teton	$20.00	4/8/2008	32	69.5
10643	Teton	$8.00	3/1/2009	263	923.3
10673	Teton	$28.12	3/1/2010	329	1278.08
10686	Teton	$20.00	3/1/2010	160	614.87
10490	Toole	$8.00	7/8/2002	120	320
4051	Toole	$11.77	3/1/2003	79	364.4
9240	Toole	$11.77	3/1/2003	35	152
9613	Toole	$8.00	3/1/2005	60	240
10557	Toole	$7.00	3/1/2005	26	97.17
10566	Toole	$7.00	8/12/2005	18	77
5183	Toole	$11.00	3/1/2006	17	154.9
2805	Toole	$15.00	3/1/2007	240	640
10006	Toole	$11.00	3/1/2009	39	157.59
8243	Toole	$12.92	3/1/2010	93	311.25
8349	Toole	$10.00	3/1/2010	128	417.15
10619	Treasure	$9.00	11/27/2007	297	1583.16
2167	Valley	$9.44	3/1/2002	137	640
4056	Valley	$7.77	3/1/2003	26	130.98
9368	Valley	$10.25	3/1/2004	59	228.75
7358	Valley	$13.50	3/1/2005	88	155
8777	Valley	$15.00	3/1/2006	102	640
8767	Valley	$20.00	3/1/2010	71	447.59
8978	Valley	$15.00	3/1/2010	876	4326.93
978	Valley	$26.23	3/1/2011	54	237.3
6919	Wheatland	$16.75	3/1/2005	132	628.88
10561	Wheatland	$14.00	3/1/2005	114	480
10675	Wheatland	$14.17	4/1/2010	112	310
9918	Wheatland	$23.00	3/1/2011	132	630
2351	Wibaux	$15.00	3/1/2002	160	640
5265	Wibaux	$20.00	3/1/2006	62	274.58
10621	Wibaux	$27.52	11/27/2007	160	640
10649	Wibaux	$8.00	3/1/2009	24	89.8
7297	Wibaux	$28.35	3/1/2010	10	33.8
862	Wibaux	$26.50	3/1/2011	160	640
3773	Yellowstone	$7.00	3/1/2003	322	447
4235	Yellowstone	$8.50	3/1/2003	140	562.92
10519	Yellowstone	$25.26	8/8/2003	119	621

Lease #	County	$/AUM	Terms Efftective Date	AUMs	Acres
10520	Yellowstone	$16.27	8/22/2003	75	360
6218	Yellowstone	$11.48	3/1/2004	122	470
4807	Yellowstone	$13.00	3/1/2005	68	365.7
5270	Yellowstone	$14.50	3/1/2005	112	623
7685	Yellowstone	$30.64	3/1/2005	26	160
7937	Yellowstone	$30.00	3/1/2005	122	640
8231	Yellowstone	$10.00	3/1/2005	54	297.04
10577	Yellowstone	$25.00	1/5/2006	76	313
10289	Yellowstone	$15.36	3/1/2008	125	640
6850	Yellowstone	$9.68	3/1/2009	31	87
6853	Yellowstone	$10.00	3/1/2009	20	100
10662	Yellowstone	$7.36	6/15/2009	139	610

APPENDIX C: COMMUNICATION ON BIA GRAZING LEASE RATES

Chris,

I don't have average prices but here are the rates I do have for reservations in Montana, Wyoming, and Idaho.

The minimum AUM rental rates on the following reservations:

Blackfeet	18.50
Crow (tribally determined)	25.00
Fort Belknap	19.00
Fort Peck	15.75
N. Cheyenne	15.00
Wind River Wyo	13.20
Ft. Hall Idaho	14.50

Hope this helps,

Dave Hopkins
BIA-Rocky Mountain Regional Office
316 N 26th St
Billings, Mt 59101
406 247-7925

From: Chris Neher [mailto:Bioecon@montana.com]
Sent: Tuesday, March 15, 2011 1:44 PM
To: Hopkins, David
Subject: Grazing Lease Rates

Hi Dave,

Thanks for chatting with me. To recap, we are working on a contract for MT DNRC to look at the pricing of state trust grazing lease rates. I am looking at other leases in the state to set some benchmark lease rates for comparison.

I would be interested in getting from you:

1) the minimum bid per AUM for each of the reservations you have data on, and

2) if available, the average price per AUM by reservation for current leases.

Also, the typical terms of the leases would be helpful to me.

Thanks for any help you can provide.

Chris

Chris Neher
Bioeconomics, Inc.
315 S. 4th Street E.
Missoula, MT 59801
(406) 721-2265

APPENDIX D: NASS MONTANA PRIVATE GRAZING FEES

PRIVATE GRAZING FEE RATES:
Average Rates by Method of Payment 1/, Montana, USA

Last updated January 31, 2011

Year	Animal Unit 2/	Cow-Calf	Per Head
	Dollars Per Month		
1/ Non-irrigated grazing land. 2/Includes animal unit plus cow-calf rates. Cow- calf rate converted to animal unit (AUM) using (1 aum= cow-calf *0.833). 2/ Insufficient reports to compute average.			
2010	18.40	20.20	19.30
2009	18.00	20.20	18.90
2008	18.10	20.00	19.80
2007	17.80	20.10	19.20
2006	16.20	18.70	18.30
2005	16.20	18.70	17.30
2004	15.90	17.40	16.20
2003	15.20	17.40	15.90
2002	15.10	17.30	16.30
2001	14.90	16.70	16.00
2000	14.10	15.60	14.70
1999	13.20	15.00	14.00
1998	12.60	14.30	13.30
1997	12.30	13.90	13.20
1996	11.80	13.20	11.70
1995	11.90	13.70	12.80
1994	11.80	13.50	12.90
1993	11.40	12.90	11.50
1992	11.86	12.61	11.97
1991	10.58	12.13	10.53
1990	9.61	11.46	10.57
1989	9.61	11.35	7.72

1988	9.79	11.30	8.79
1987	7.94	9.52	2/
1986	8.30	9.35	7.85
1985	8.80	10.63	9.38
1984	9.48	11.28	9.94
1983	9.23	11.12	9.99
1982	8.90	10.67	2/
1981	9.40	11.30	8.63
1980	9.07	10.52	9.40
1979	--	--	8.40
1978	--	--	7.40
1977	--	--	7.30
1976	--	--	7.40
1975	--	--	7.00
1974	--	--	6.60
1973	--	--	4.80
1972	--	--	4.30
1971	--	--	4.00
1970	--	--	3.90
1969	--	--	3.70
1968	--	--	3.70
1967	--	--	3.60
1966	--	--	3.30
1965	--	--	3.10
1964	--	--	3.00
1963	--	--	2.90
1962	--	--	2.80
1961	--	--	2.70
1960	--	--	2.60

http://www.nass.usda.gov/Statistics_by_State/Montana/Publications/economic/prices/grazefee.htm

APPENDIX E: ADDITIONAL AND SUPPORTING ANALYSIS

TABLE 10. COMAPRISON OF NASS PRIVATE MONTANA LEASE RATES AND DNRC TRUST LAND BASE RATES: 1980-2010 IN CONSTANT 2010 DOLLARS

Year	NASS Private Montana Lease Rate (constant 2010 $)	DNRC Trust Land Base Rate (constant 2010 $)
1980	$ 24.00	$ 9.63
1981	$ 22.55	$ 9.24
1982	$ 20.11	$ 7.84
1983	$ 20.21	$ 6.50
1984	$ 19.90	$ 6.30
1985	$ 17.83	$ 5.55
1986	$ 16.51	$ 5.59
1987	$ 15.24	$ 5.32
1988	$ 18.05	$ 6.03
1989	$ 16.90	$ 6.84
1990	$ 16.03	$ 6.54
1991	$ 16.94	$ 6.79
1992	$ 18.43	$ 6.48
1993	$ 17.20	$ 6.08
1994	$ 17.36	$ 6.02
1995	$ 17.03	$ 7.37
1996	$ 16.40	$ 6.30
1997	$ 16.71	$ 4.89
1998	$ 16.86	$ 5.36
1999	$ 17.28	$ 5.76
2000	$ 17.85	$ 5.28
2001	$ 18.35	$ 6.83
2002	$ 18.30	$ 7.51
2003	$ 18.01	$ 6.84
2004	$ 18.35	$ 6.33
2005	$ 18.09	$ 7.41
2006	$ 17.52	$ 7.56
2007	$ 18.72	$ 8.28
2008	$ 18.33	$ 7.03
2009	$ 18.30	$ 7.08
2010	$ 18.40	$ 6.12

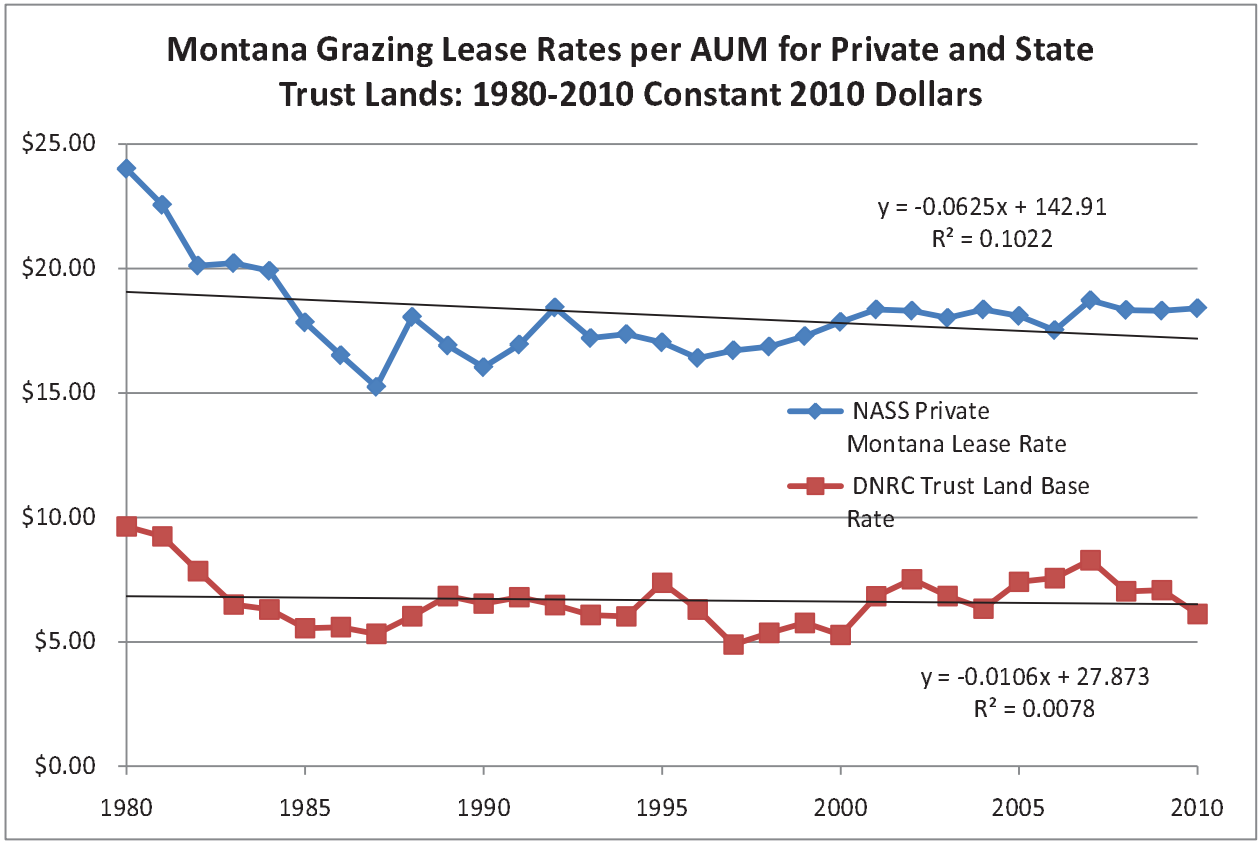

FIGURE 7. COMPARISON OF MONTANA PRIVATE AND DNRC BASE GRAZING RATES IN CONSTANT 2010 DOLLARS

TABLE 11. COMPARISON OF PRIVATE AND DNRC AVERAGE COMPETITIVELY BID LEASE RATES: 2002-2010 IN CONSTANT 2010 DOLLARS

Year	DNRC Competitively Bid $/AUM (constant 2010 $)	NASS Montana Private Lease Rate (constant 2010 $)
2002	$ 12.97	$ 18.58
2003	$ 15.17	$ 18.28
2004	$ 12.26	$ 18.63
2005	$ 16.05	$ 18.36
2006	$ 16.41	$ 17.78
2007	$ 15.25	$ 19.00
2008	$ 17.00	$ 18.60
2009	$ 13.96	$ 18.57
2010	$ 16.94	$ 18.67

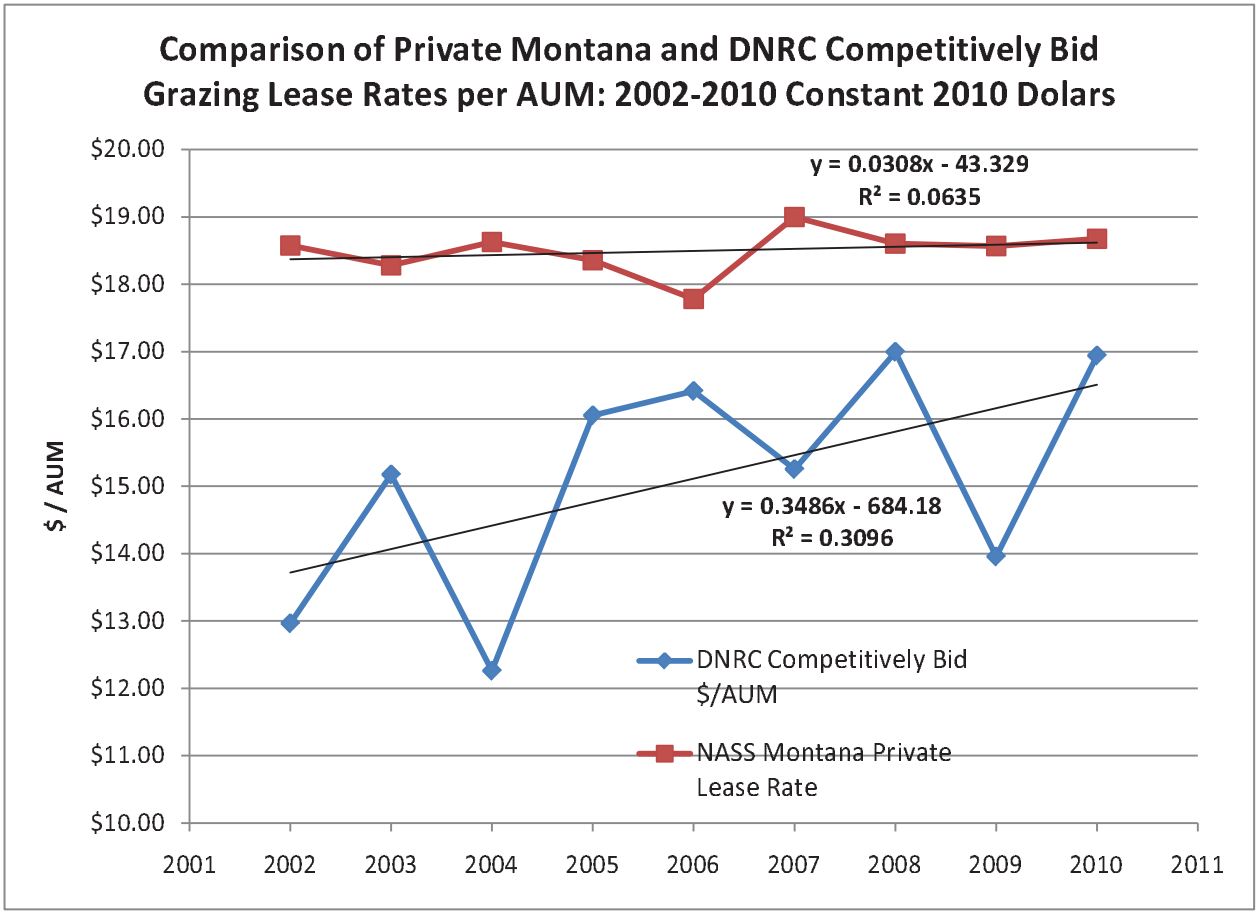

FIGURE 8. COMPARISON OF PRIVATE AND DNRC COMPETITIVELY BID LEASE RATES: 2002-2010 IN CONSTANT 2010 DOLLARS

TABLE 12. 2005 GAO REPORT STATE AND FEDERAL GRAZING LEASE RATES

Table 9: Fees Charged by Private Ranchers and State Land Agencies in 2004

State	State land agency (per AUM unless noted)	Average private fee (per AUM)[a]	Average private fee (per head)[a]
Arizona	$2.23	$8.00	$9.00
California	1.35 to 12.50	14.50	15.50
Colorado	6.65 to 8.91	13.50	14.00
Idaho	5.15	12.20	12.60
Kansas	[b]	13.00	13.50
Montana	5.48 to 80.00	15.90	16.20
Nebraska	16.00 to 28.00	23.00	25.20
Nevada	[b]	10.60	12.00
New Mexico	0.71 to 10.15 per acre	9.70	11.00
North Dakota	1.73 to 19.69 per acre	13.00	13.50
Oklahoma	7.00 to 16.00	8.00	8.50
Oregon	4.32	13.00	12.50
South Dakota	3.00 to 56.00 per acre	17.60	19.20
Texas	4.16 to 12.50	10.00	9.80
Utah	1.43 or 2.35	11.80	13.10
Washington	5.41 or 7.76	10.80	10.80
Wyoming	4.13	13.90	14.30

Source: State agencies and National Agricultural Statistics Service (data); GAO (analysis).

Note: The 11 western states used to calculate the BLM and Forest Service fee are Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming. The 9 Great Plains states used to calculate the Forest Service grassland fee are Colorado, Kansas, Nebraska, New Mexico, North Dakota, Oklahoma, South Dakota, Texas, and Wyoming.

[a]The National Agricultural Statistics Service gathers data on fees per AUM and per head. The per head fee is used in the PRIA fee and, because of the way that BLM and the Forest Service measure AUMs for billing purposes, corresponds to the fee per AUM charged by BLM and the Forest Service.

[b]Kansas and Nevada do not have grazing on state trust lands and therefore did not provide fee information.

Table 8: Fees Charged by Federal Agencies, State Land Agencies, and Private Ranchers, 2004

Agency	Range of fees charged per AUM (or equivalent)[a]	Average fee charged per AUM (or equivalent)[a]	Approach to setting fee
Interior			
BLM	[b]	$1.43	Executive order—formula
National Park Service	$1.35 to $7.00 1.50 to 25.00 per acre	4.30	Fixed prices and market value
Reclamation	1.27 to 56.46	10.93	Market value and fixed prices
U.S. Fish and Wildlife Service	0.29 to 34.44	11.24	Market value and negotiated prices
USDA			
Forest Service—16 western states	[b]	1.43	Executive order—formula
Forest Service—grasslands	[b]	1.52	Formula
Forest Service—eastern states	2.47 to 5.04	[b]	Formula and market value
DOE	[b]	1.43	BLM fee—formula
DOD			
Air Force	1.35 to 26.67[c]	15.49	Market value
Army	0.99 to 66.09[c]	19.10	Market value
Corps	0.82 to 112.50[c]	6.22	Market value
Navy	10.42 to 97.49[c]	32.60	Market value
States			
Arizona	[b]	2.23	Market-based appraisal with annual adjustment
California	1.35 to 12.50	[b]	Market based on average rates
Colorado	6.65 to 8.91	[b]	Market-based formula
Idaho	[b]	5.15	Formula similar to federal fee
Kansas	[d]	[d]	[d]
Montana	5.48 to 80.00	[b]	Market with minimum bid
Nebraska	16.00 to 28.00	[b]	Market with minimum bid
New Mexico	0.71 to 10.15 per acre	[b]	Market with minimum bid
Nevada	[d]	[d]	[d]
North Dakota	1.73 to 19.69 per acre	[b]	Market with minimum bid
Oklahoma	7.00 to 16.00	[b]	Market with minimum bid
Oregon	[b]	4.32	Formula based on production factors
South Dakota	3.00 to 56.00 per acre	[b]	Market with minimum bid
Texas	4.16 to 12.50	[b]	Market-based appraisal
Utah	[b]	1.43 or 2.35	Formula similar to federal fee
Washington	[b]	5.41 or 7.76	Market-based formula or formula based on production factors

Wyoming	[b]	4.13	Market-based formula
Private ranchers—17 states*	8.00 to 23.00	13.40	Market value

Sources: GAO's analysis of data provided by 10 federal agencies, 17 state agencies, and USDA's National Agricultural Statistics Service.

Note: The 11 western states used to calculate the BLM and Forest Service fee are Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming. The 9 western and Great Plains states used to calculate the Forest Service grassland fee are Colorado, Kansas, Nebraska, New Mexico, North Dakota, Oklahoma, South Dakota, Texas, and Wyoming.

[a]For permits and leases that are competitively bid, a total amount is often bid. In such cases, we divided that total by the amount of AUMs in the permit or lease to determine an equivalent fee per AUM.

[b]Data are not applicable or available.

[c]The ranges reported for the Army, Corps, Air Force, and Navy have been converted by dividing the total receipts plus offsets by the number of AUMs reported. The ranges are based on average lease prices for the installations, bases, and projects.

[d]Kansas and Nevada do not manage grazing on state trust lands and therefore did not provide fee information.

*The private rancher fees in the 17 states are calculated using AUM and per head data, adjusted. The formula is (AUM + per head)/2.